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STUDIES ON WEANING AND SUPPLEMENTARY FOODS

Report of the Working Party
of the
Indian Council of Medical Research

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PREFACE

It is generally agreed that the problem of protein-calorie malnutrition can only be solved by educating rural communities to effectively utilize inexpensive locally available foods within their economic reach. In order to carry out such nutrition education, health workers must possess practical information as to the most suitable recipes, based on locally available foods which can be used be poor communities for infant and child feeding in different regions of the country. The recipes must be such that they are acceptable to rural communities and are also nutritionally adequate.

The Indian Council of Medical Research had set up a Working party to undertake investigations which would lead to formulation and evaluation of such recipes. This report contains an account of these studies.

The report has been compiled from the data provided by the participating units by Dr. S. G. Srikantia, Deputy Director, National Institute of Nutrition, Hyderabad, assisted by Dr. N. Pralhad Rao, Mr. K. Visweswar Rao and Dr. K. Vijayaraghavan of the Division of Field Studies of the National Institute of Nutrition.

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1. INTRODUCTION

It is recognised that widespread malnutrition prevalent among the poor socio-economic groups of our population is largely attributed to economic factors. However, it cannot be denied that social and cultural factors also contribute significantly to the overall picture of malnutrition in our poor communities. Faulty feeding habits arising from ignorance, superstitions and wrong food beliefs must be considered as being responsible for aggravating malnutrition in such communities. Among the most vulnerable segments of population from the nutritional standpoint are infants and young children, and it is, therefore, not surprising that protein calorie malnutrition in children belonging to the poor socio-economic classes is a major public health problem in our country.

Field surveys carried out several years ago by the National Institute of Nutrition among the four Southern States in India have indicated that the very severe forms of the disease like kwashiorkor and marasmus are found among 2 to 3% of all children between the ages of 1 and 5 years. While this figure in itself is high, this is a gross under-estimate of the real extent of the problem. Judged by growth failure, almost 80% of rural children belonging to the poor income groups in our country may be considered as suffering from moderate and severe degrees of malnutrition. While this growth retardation *per se* may not be of serious consequence, there is now experimental evidence to show that malnutrition during critical phases of growth may have long-term repercussions not only on physical stature and stamina but also on mental performance.

There is a large body of data pointing to a clear socio-economic gradient with respect to birth weights of infants, those born to mothers of low economic groups being about 300–400 g. lighter than those born to mothers of the well-to-do groups. However, the rate of growth of infants born to poor mothers, among whom successful breast feeding is almost invariably practised, is similar to the rates of growth observed in infants of well-nourished mothers. This satisfactory rate of growth is seen upto the age of 4 to 6 months, beyond which period, infants belonging to under-nourished mothers tend to exhibit a slower rate of growth. The main reason for this observation is that the nutrients supplied by breast milk are sufficient to sustain satisfactory growth only upto the age 4 to 6 months, and supplementary foods are necessary beyond this age. In most of our poor rural communities, however, supplementary feeding is not started till at a much later date, one of the main reasons being the mother's belief that as long as the child is receiving some breast milk, there is no need for additional food. Even when supplementary foods are introduced relatively early, both the quantity and quality of the supplements are far from satisfactory. It would thus appear, that infant weaning practices contribute largely to the unsatisfactory rate of growth beyond 6 months of age among infants belonging to the poor socio-economic classes.

Protein calorie malnutrition is essentially a disease that occurs during the crucial transitional phase of a child's life from breast milk to other types of foods. Though there are a number of commercial preparations specifically designed for purposes of weaning, it must be pointed out that not only such products are expensive and beyond the economic reach of the rural population, but their availability in such areas is also severely restricted. There is, thus, an urgent need to develop satisfactory, cheap, infant weaning foods which can be prepared from locally available resources in a community for use among the poor socio-economic classes. In addition to improving the economic status of the families, making available such infant weaning food must be considered an important measure in the control and prevention of protein calorie malnutrition during late infancy and early childhood. The development of these infant foods calls for not only a proper understanding of the weaning habits and weaning practices of the community, but also on the resources available within each community from which suitable recipes could be developed.

In view of these considerations, the Indian Council of Medical Research set up a Working Party on infant weaning foods, to carry out studies in depth, in different parts of the country to develop suitable weaning foods, and to devise appropriate methods of evaluating and popularising them among the communities. This working party at its first meeting held at the National Institute of Nutrition, Hyderabad, in October 1965 decided to undertake a comprehensive field investigation in different regions of the country, so that practical solutions to the problem could be obtained. The following six centres situated in different regions of the country were selected for carrying out the work :

1. Sri Avinashilingam Home Science College, Coimbatore.
2. Institute of Rural Health and Family Planning, Gandhigram, Tamil Nadu.
3. National Institute of Nutrition, Hyderabad.
4. Directorate-General of Health Services (P. H.) New Delhi.
5. B. J. Medical College and Sassoon General Hospital, Poona and
6. All India Institute of Hygiene and Public Health, Calcutta.

2. GUIDELINES FOR THE SURVEY

It was recommended by the Working Party that the work relating to weaning foods may be conveniently undertaken sequentially in three phases.

(1) It was suggested that during the first phase basic information should be collected regarding weaning practices, types of weaning foods currently being used, acceptability of locally available protein-rich foods, and cultural and social concepts about food patterns. During the second phase, based on the data collected, suitable weaning recipes should be developed and their nutritional quality evaluated. During the third phase, the best method of propagating the use of the recipes may be investigated.

(2) The study should be carried out in an area with a homogeneous population of about 2500. About 200 children between the ages of 6 months and 3 years should be taken up for special study of weaning habits, etc. However, for urban areas, a larger sample was suggested.

(3) As a result of information obtained in the first phase of study, it was recommended that attempts should be made to develop three types of recipes; one that is capable of being prepared easily at home by the mother on a daily basis; another, also being capable of being prepared at home, but of a ready-to-mix and eat type, and the third which would be suitable for small scale processing at the village or block level.

(4) It was recommended that the evaluation of nutritional quality of the recipes developed at various centres be undertaken only at centres which had the facilities and expertise for this purpose.

3. METHODOLOGY

To ensure uniformity and comparability of data collected at the various centres by different workers, a set of standard proformae (Annexures I, II and III) were prepared and pre-tested by the National Institute of Nutrition, Hyderabad. These proformae were used at all centres.

3. 1. First phase

During the first phase two types of surveys were undertaken: (a) A survey to obtain information regarding locally available and acceptable protein-rich foods in a representative sample of villages near the investigating centres. All relevant information was collected from resource-persons like village headmen, village teachers, landlords and local shop-keepers. (b) A survey of regional weaning practices in a representative sample of 200 mothers, who had children between the ages of 6 months and 3 years. The sample was selected using statistical considerations. A pre-tested questionnaire was administered to the mother, and when the mother was not available, to the nearest relative of the child who was competent to provide information about the child. All the information was collected during one interview. The information collected in the questionnaire always pertained to the youngest child in the family. Copies of the proformae used in the investigation are provided in Annexure I.

3. 2. Second phase

Based on the information collected from the above surveys, suitable recipes of three types were developed.

(a) Recipes which could be easily prepared fresh at home daily by the mothers,

(b) Ready-to consume infant food mixtures which could be made by mothers at home in bulk quantities and used as and when needed, and

(c) Recipes like biscuits, toffees, etc., which could be prepared on a commercial basis by local tradesmen and sold in village shops.

The nutritive value of some of the recipes developed at various centres was determined at the National Institute of Nutrition, Hyderabad, and the Avinashilingam Home Science College, Coimbatore. The acceptability of a few selected recipes from each centre were carried out by the respective centres by feeding each of the selected recipes to children belonging to the age group of 6–12 months, 13–24 months and 25–36 months.

3. 3. Third phase

This phase was concerned with the development of ways and means of propagating the use of these recipes by the local population, and for this purpose, supplementary feeding programmes were organised at each investigating centre for children between the ages of 1-5 years.

4. RESULTS

Area covered and the region-wise age distribution of the children studied under the survey are given in Tables 1 and 2. A total sample of 2415 children under 3 years of age was covered from six different regions of the country. Of this, 57% was drawn from the rural areas in Coimbatore, Gandhigram, Hyderabad and Poona, while the rest of the sample was urban and semi-urban from localities of Calcutta and New Delhi.

4. 1. Occupational status

In rural areas of Hyderabad, Coimbatore, Gandhigram and Poona, a great majority of people were engaged in agriculture. Artisans like potters, blacksmiths, goldsmiths, toddy tappers, etc., formed a small minority. However, in the urban and semi-urban areas of Calcutta and New Delhi, a great majority were wage earners and a small proportion formed skilled workers like tailors, carpenters and petty businessmen. Most of the families had incomes in the range of Rs. 100–300 per caput per year except in Gandhigram area where about 65% of the families had an yearly per caput income of less than Rs. 100.

4. 2. Food habits of the mother

4. 2. 1. Food preferences of the mother after delivery: A wide variety of foods which were considered to be good during the period immediately after delivery and were preferentially consumed are listed, in order of preference, in Table 3 for six different regions.

Foods of animal origin like meat, fish, eggs, milk and milk products were considered to be good for health during the post-natal period. Other foods like cereals (wheat and rice), fruits and green leafy vegetables were also commonly consumed. Some of the spices like black pepper and cumin seeds were more popular than the others like turmeric, ginger and asafoetida in some areas of survey.

These preferential food consumption practices could be traced to certain culturally determined belief systems associated with community concepts of 'hot' and 'cold' foods. All the foods believed to produce 'cold effects' were avoided during this period while foods considered to produce 'hot effects' were usually consumed by the mothers. In the Hyderabad area many women mentioned 'toddy' (Fermented sap of palm tree) and 'brandy' as desirable foods to be consumed not only during pregnancy, but also after confinement.

4. 2. 2. Foods avoided immediately following delivery: A list of such foods is given in Table 4. In general, root vegetables and tubers, pulses and nuts, spicy and sour foods and some green leaves like Agathi, gogu and nonleafy vegetables like drumstick, gourds and brinjal were avoided for varying periods after delivery. The main reasons for avoidance of such foods were :

Table 1

STUDIES ON INFANT WEANING FOODS - AREA AND COVERAGE

CENTRE	PLACE	Rural/Urban	Number of villages covered	Approximate Number of House-holds in the area	Number of Mothers Interviewed
Coimbatore					
Sri Avinashilingam Home Science College	Perianaicken Palayam Block	Rural	8	470	250
Gandhigram (Tamil Nadu)					
Institute of Rural Health and Family Planning	Athoor Block Dindigal Taluk	Rural	3	2500	240
Hyderabad					
National Institute of Nutrition	Hayat Nagar Block Hyderabad East Taluk	Rural	4	1000	200
New Delhi					
Lady Irwin CIlege	C D Blocks	Rural			268
	Delhi Area		4	1800	
	a) Adichini b) Mimne	Semiurban localities			232
Poona					
Sassoon General Hospital	Villages around Poona	Rural	4	2200	200
West Bengal					
All India Institute of Hygiene and Public Health, Calcutta.	(i) Singur Block	Rural		12600	250
	(ii) Calcutta			1300	844
	a) Chetta b) Manicktolla	Urban localities	6		
			Total	21870	2484

Table 2

DISTRIBUTION OF THE CHILDREN ACCORDING TO AGE

Age (month)	Coimbatore	Gandhigram	Hyderabad	New Delhi		Poona	West Bengal	
				Rural	Semiurban		Rural	Urban
Below 6	77	—	43	91	73	43	4	24
6 to 12		—					67	213
12 to 18	51	12	47	103	105	40	65	166
18 to 24	39	59	33			38	96	131
24 to 30	36	53	41	74	54	47	72	123
30 to 36	47	47	35			32	45	83
Above 36	—	69	—	—	—	—	—	—
Total :	250	240	200	268	232	200	250	844

Table 3

FOOD PREFERENCES OF MOTHERS AFTER DELIVERY

Coimbatore	Gandhigram	Hyderabad	New Delhi	Poona	West Bengal		
					Chetla	Manicktolla	Singur
Bread+ Coffee/Milk	Wheat bread and Milk	Goat's meat	Pat (jaggery syrup)	Bajra Milk and Ghee	Milk	Milk	Ghee
Rice + Pepper and Garlic rasams	Rice and Pepper water	Dal	Mohia	Chapathi	Fish, meat, egg	Ghee	Fried chira
Palm jaggery	Coffee	Tomato	Tea	Suji (shira)	Fruits	Fish, egg, meat	Milk
Dried ginger powder		Spinach Fish	Milk	Methi	Fried onion	Fruits	Rice
		Milk and bread	Halva	Sago	Green banana	Fried chira (puffed rice)	Boiled potato
		Brandy	Laddu	Eggs	Fried chira (puffed rice)	Fried vegetable	Puffed rice
		Ghee	(Groundnut, coconut)	Mutton	Loaf Luchi, Parota	Boiled egg	Fish, meat and egg
		Toddy	Coriander	Dry coconut	Sago and milk chapathi	Rice	Fruits
		Goat's intestine	Jeera	Dates and 'Dink'	Suji	Loaf	Sandesh
			Ajwani	Pepper and Cumin seeds	Black pepper	Luchi Parotha	Fried green banana
			Ghee		Boiled Potato papaya	Black cumin Chapathi Lentils Turmeric Molasses Ginger, spices Sandesh Whey Black pepper Sago	Sago Chapathi Tea Suji Black pepper Loaf Pulses Turmeric
			Meat		Sandesh Black cumin Tea, Coffee Asfoetida Mustard oil		

Table 4

FOODS AVOIDED BY MOTHERS AFTER DELIVERY

Coimbatore	Gandhiaram	Hyderabad	New Delhi	Poona	West Bengal
Cholam or Ragi kali	Pulses	Puntikura *(Hibiscus cannabinus)*	Sourfoods like Tamarind	Brinjal	Fish, meat, egg
Rice vegetables	Root vegetables	Brinjal	Mango (unripe)	Potato	Leafy vegetables
Dhal kulumbu		Cluster beans	Lemon and pickles	Cluster beans	Pulses, sour and spicy
Jack fruit		Potato	Lassi, curds	Black gram	Onions
Egg, mango, pulses		Gourds	Fried and spicy foods		Mustard oil
Drumstick			Rice Blackgram Bengal gram Vegetables like potato, cabbage etc.		Pumpkin

(1) These foods are 'cold producing' and lead to stiff joints and paralysis of limbs.

(2) These foods are hard to digest and, therefore, cause gastro-intestinal disturbances not only in mothers but also in their breast-fed infants.

4. 2. 3. Galactogogues: Many mothers held the belief that the consumption of certain foods led to increased secretion of breast-milk. Foods of animal origin like goat's meat, fish, mutton and milk were believed to increase the secretions of breast milk in almost all the regions. In all areas except in Delhi, green leafy vegetables like spinach, gourd leaves and fruits like green banana and papaya, were credited with specific galactogogic property. In some areas, garlic, ginger, dry coconut and fruits were also believed to help lactation and were, therefore, specially consumed during the period following delivery (Table 5).

4. 3. Feeding habits of infants and children

4. 3. 1. First feed: Feeding practices in the new-borns during the first few days after birth showed considerable regional variations (Table 6).

During the first 24 hours, the majority of newborns, in all the regions received water sweetened with either sugar or jaggery (gur). In some places, honey was used as the sweetening agent. In the Delhi area, many babies often received a locally prepared commercial product called "ghutti" (which was also marketed under different commercial names like 'gurghutti', 'buraghutti', 'khandghutti' and 'janamghutti' etc.), which is believed to be a formulation of sweetened water and some herbal medicine, for the first 2-3 days. A few mothers also fed thier new borns on infusions of omam (*Trochyspermum ammi)* (ajwan) and anisi seed (sonf) as the first feed.

In Coimbatore,sugar water was often mixed with cow's milk,while in Gandhigram, sugar water, cow's milk and castor oil either singly or in combinations constituted the main feeds during the first 2-3 days.

More than 50% of the neonates in the Hyderabad area were wet-nursed by a near relative till the third day of life, while the rest put their infants to the breast right from the first day.

4. 3. 2. Colostrum: A great majority of mothers in Poona and Gandhigram area manually expressed the colostrum and discarded it, while in the regions of Hyderabad and Coimbatore, a majority of mothers fed colostrum to their infants. A small minority of mothers, 6% in Hyderabad and 3% in Coimbatore discarded colostrum due to the belief that it was bad for the child's health. In the Delhi region, mothers belonging to the Muslim and Christian communities avoided feeding colostrum. The main reason for the delay in starting breast feeding, in some of the regions, appeared to be the belief that lactation gets established only around the third day. It did not seem to be based on any belief that immature breast milk was qualitatively undesirable, except among mothers in Poona and Gandhigram, where colostrum was purposely discarded by the majority of mothers. Irrespective of the reason for delayed onset of breast feeding in these communities, the feeds given during the first 48 to 72

Table 5

GALACTOGOGUES COMMONLY CONSUMED

Coimbatore	Gandhigram	Hyderabad	New Delhi		Poona	West Bengal		
			Semi-urban	Rural		Chetla	Manicktalla	Singur
Mutton and Agathi	Mutton	Goat's meat	Milk	Milk	Bajra	Milk and sago	Fish	Rice and rice water
Kali	Fish	Dry fish	Jeera preparation	Jeera prepration	Methi (Fenu greek leaves)	Fish	Milk	Milk, sago
Milk and Milk products	Chicken	Dals	Laddus and Goond	Ghee	Goat's meat	Gourd leaves and spinach	Milk and sago	Fish
Vegetables	Egg	Spinach	Coconut	Laddus and Goond	Milk	Pulses	Lentils	Lentils
Dried fish	Milk	Garlic	Ghee	Daly and Dry fruits	Egg	Frutts	Rice and rice water	Meat, eges
Beef	Greens	Earthworm	Dry fruits		Dry coconut	Rice & rice water	Gourd leaves	Gourd leaves
Rice	Garlic	Egg			Dates and 'Dink'	Black cumin Ghee & butter	Fruits	Butter
Ragi	Gingelly	Prawns			Dry fiish	Green banana & papaya	Boiled vegetables	Puffed rice
Egg	Ghee and honey	Kovai *(Coccinia cordifolia)*			Pepper and Cumin seeds	Egg, meat	Ghee	
Greens	Cumbu millet	Goat's udder			Garlic	Turmeric mustard oil	Black cumin	
					Earthworms	Sonth	Butter	
						Ajwan	Ginger	
						Wheat and milk	Fried chira	
							Khichuri	

Table 6

NEONATAL FEEDING PRACTICES IN DIFFERENT REGIONS

	Coimbatore	Gandhigram	Hyderabad	New Delhi	Poona
Feeding during first few days	1. Sugar solution + Cow's milk	1. Sugar water with or without cow's milk	1. Breast feeding	1. "Ghutti"* (sweetened water)	1. Water + Sugar
	2. Breast feeding	2. Sugar water + Cow's milk with or without castor oil	2. Wet-nursing by a near relative	2. Breast feeding	2. Water + Honey
		or			
		3. Castor oil	3. Glucose-water	3. Infusions of omam ('Ajwan') anisi seed ('Sonf')	
				4. Cow's or buffalo's milk	
				5. Wet-nursing	
Feeding of colostrum	Only 3% of mothers held the view that colostrum was bad for child	Majority (80–90%) disearded colostrum	Majority (more than 94%) did not discard colostrum	Only few mothers of Muslim & Christian community discarded colostrum	Majority discarded colostrum

* "Ghutti" is a local product consisting of sweetened water and some herbal medicine and is commercially sold in local markets.

hours period between birth and breast feeding was culturally determined ranging from wet nursing (Hyderabad) to feeding of plain sweetened water alone (Poona) or mixed with herbal concoctions (Delhi), castor oil and animal milk (Gandhigram and Coimbatore).

In all the regions, feeding on demand was the rule, and most mothers fed their babies during the nights also. On an avarage, infants received between 5—7 feeds during the day. It was difficult to assess the frequency of feeds during the nights.

4. 3. 3. Duration of exclusive breast feeding: The period of exclusive breast feeding showed considerable differences from one area to another. It varied from one month to more than a year. In Calcutta, on an average, 40% of the children were exclusively on breast milk during the first month. Only 10% of infants were solely breast-fed by the age of 6 months. In contrast, in other regions a fair number of children were entirely breast-fed even upto 18 months of age.

4. 3. 4. Supplementary foods: Foods given as supplements to children by mothers in different regions are indicated in Tables 7 and 8.

4. 3. 4. 1 Liquid supplements: In general, the period of exclusive breast feeding was followed by the introduction of liquid supplements, followed later on, by semi-solid supplements. Although cow's milk was mentioned by the majority of mothers in all the regions as the most desirable supplement to be given to children, in practice, however, buffalo's milk was more frequently given. Due to economic constraints instead of milk, tea, coffee and conjee were usually offered in most of the families (Table 7).

Table 7

COMMON LIQUID/SEMISOLID SUPPLEMENTS USED IN DIFFERENT REGIONS

Combatore	Gandhigram	Hyderabad	New Delhi	Poona	West Bengal
Milk	Milk	Milk	Milk	Milk	
Coffee	Coffee	Toddy	Tea	Tea	
Rice conjee	Cholam porridge	Tea	Fruit juice	Rice conjee	Not available
Ragi/jowar porridge			Curds and Lassi	Jowar porridge	
Tinned baby food like Amul, Glaxo etc.					
Fruit juice					

A majority of mothers in the regions of Coimbatore and Gandhigram gave porridge prepared from cereals like rice. ragi and cholam as supplements. In the region of Hyderabad, varying amounts of toddy were given as supplements to children.

The ages at which these supplements were offered differed from one region to another. It was as early as 2 months in Calcutta and as late as 10 months in Poona, Delhi and Hyderabad, with Coimbatore and Gandhigram falling in between.

4. 3. 4. 2. Solid supplements : Introduction of solid foods were generally delayed and always followed liquid/semi-solid supplements. The most commonly used solid supplements in all the regions were bakery products like biscuits and bread as also preparations based on local staple cereals and millets like rice, wheat, cholam and ragi.

Table 8

COMMON SOLID/PREPARATIONS USED IN DIFFERENT REGIONS

Coimbatore	Gandhigram	Hyderabad	New Delhi	Poona	West Bengal
Rice	Rice	Biscuits	Biscuits	Biscuits	Biscuits
Rice with milk and ghee	Iddly	Snacks	Wheat roti	Jowar roti	Rice
Biscuits	Dhosai	Adult food	Khichri	Wheat roti	Boiled potato
Cholam kali	"Paniyarm" (Rice and black gram)		Dhalia	Rice	Pulses
Rice and Rasam	Wheat		Kheer		Chapathi
	Cholam		Halwa and puri		Boiled vegetables
	Ragi				Egg, Meat

The age at which solid foods were started, and the percentage distribution of children by age at which solid supplements were introduced in different regions are presented in Tables 9 and 10.

Table 9

AGE AT WHICH MORE THAN 50% OF CHILDREN RECEIVED SOLID SUPPLEMENTS

Region :	Coimbatore	Gandhigram	Hyderabad	New Delhi	Poona	West Bengal
Age (months)	6 to 12	6	12 to 18	12	7 to 12	Below 6

Table 10

PERCENTAGE DISTRIBUTION OF CHILDREN BY AGE AT WHICH SOLID SUPPLEMENTS WERE INTRODUCED IN DIFFERENT REGIONS

Region / Age in months	Coimbatore	Gandhigram	Hyderabad	New Delhi	Poona	West Bengal	
						Rural	Urban
0- 6	30.4	1.33	5.0	9.3	2.0	13.5	39.4
6-12	36.0	86. 7		38.1		82.1	57.5
12.18	32.1	—	24.1	39.1	20.7	3.1	1.3
18-24	5.5	—	19.9	8.0	24.7	1.3	1.8
24-30	—	—	26.2	5.5	31.3	—	—
30 and above	—	—	24.8	—	21.3	—	—
Total	100.0	100. 0	100.0	100.0	100.0	100.0	100.0
	(470)*	(257)	(141)	(284)	(150)	(223)	(393)

* The figures in parenthesis indicate the total number of children receiving solids at the time of survey.

The introduction of solids was earliest in Calcutta, urban children receiving solid supplements earlier than did rural children, and Gandhigram followed by Coimbatore and Delhi. In Hyderabad and Poona, solids were introduced very late. Eevn at the late age of 2½ years, about 25% of children in these areas were not given solid foods. The proportion of children aged below 1 year, who were on solid supplements in different regions, were as follows:

Gandhigram 100%, Calcutta 95%, Coimbatore 66%, New Delhi 47%, Hyderabad 5% and Poona 2%.

4. 3. 4. 3. Reason for introducing supplements: Among the more important reasons for introducing supplementary foods were, insufficiency of breast milk, mother going out for work, and a desire to give additional food to the children. In many cases, mother's illness or her subsequent pregnancy determined the timing of supplementation. In rural regions especially of Hyderabad, the ability of the child to pick up and eat solid foods decided the introduction of solid supplements. Beverages like tea and coffee and toddy were given to children primarily because the parents consumed them.

In general, it appeared very few parents made any special effort to feed the child at the proper time in most of the regions. Neither special weaning foods were prepared at home by these mothers nor tinned foods were given to children in those areas. A major reason for this was the lack of awareness of the special nutritional needs of the children.

4. 3. 4. 4. Food perferences during illness of child: During illness generally, liquid or bland and sloppy foods were given to children and the usual solid and spicy foods excepting soft cooked rice, biscuits etc., were avoided.

The information available in this regard for all the regions except Gandhigram is given in Table 11. Usually, beverages like tea, coffee, milk, barley and coconut water were preferred during this period. Soft and cooked rice, sago and bakery products like bread and biscuits were also consumed. Fruits like orange, sweet lime and apple were considered good during illness of child.

4. 3. 4. 5. Prestige foods: In the regions of Delhi and Calcutta, fruits like apples, orange, grapes, sweet limes, etc. were rated high as prestige foods, while in the regions of Poona and Hyderabad, animal foods like eggs, milk, mutton were considered as prestige foods. In Coimbatore, rice with milk was considered a prestigeous food. In general, bakery products, milk and milk products and fruits were regarded as foods of prestige. A list of such prestige foods is given in Table 12.

Table 11

FOOD PREFERRED FOR CHILDREN DURING ILLNESS

Coimbatore	Hyderabad	New Delhi	Poona	West Bengal
Milk	Milk (including	Milk	Milk (including	Milk
Bread	breast milk)	Tea	breast milk)	Barley
Rice and Barley	Bread	Breast milk	Bread	Sago
Coffee	Sago	Kicheri	Rice	Bakery products
Only breast milk	Tea	Balya	Sago	Whey water
Milk and biscuits	Puffed jowar	Bread	Tea	Misry water
Rice and pappu	Jowar	Orange juice	Jowar	Horlicks
rasam		Sago	Glucose	Baby foods
Horlicks		Biscuits		Coconut water
Milk and barley		Rusks		Soft rice and
water		Banana		first Aroroot
Amul		Apple		Buttermilk and
Ragi porridge		Sweet lime		curds
Orange		Rice and curds		Suji
				Eggs
				Casein

Table 12

PRESTIGE FOODS

Coimbatore	Hyderabad	New Delhi	Poona	West Bengal
Rice	Goat's meat	Apple	Wheat-Shevian	Orange
Breast milk	Milk	Orange	Milk	Apples
Cow's or buffalo's	Egg	Grapes	Egg	Grapes
milk	Tomato	Sweet lime	Mutton	Pomogranate
Rice + milk	Dals	Banana	Goat's milk	Horlicks &
Amul	Potato	Chikoo	Fruits	baby foods
Bread, biscuits	Fish	Milk	Dals	Milk
Ragi porridge	Fruits	Ghee		Egg
Milk/bread/biscuits		Curds		Biscuits
Coffee/bread		Vegetables and		Butter
Horlicks		soup		Ghee
Milk and fruits		Honey		
Rice and jaggery		Bournvita		
Rice + Ghee/oil/		Biscuits		
salt/iddi		Tinned milk		
Rice kanji and		Butter		
Coffee and bread		Halwa		
Rice + dhal		Kheer		
Ostermilk		Kicheri		
		Balya		
		Lassi		
		Sago		
		Roti		
		Dates		
		Suji		

5. DEVELOPMENT OF RECIPES SUITABLE AS WEANING FOODS

Based on the results of the studies carried out in the first phase, each centre developed a number of recipes which could be considered as belonging to one of the following three categories. One of the basic and important features of all these recipes is that they are based upon foodstuffs available locally and also the food items are traditionally acceptable to the community. They do not contain any processed ingredient or food material which has to be brought from outside.

Category I : Preparations capable of being easily cooked at home by the housewives.

Category II : Preparations which could be made at home in bulk and stored for some time and be used as 'instant' infant foods by mixing with water or milk.

Category III : Snacks like biscuits, 'chikkies' and burfies' which could be made by local tradesmen on a small commercial scale and sold in the village shops.

A total of 82 recipes were developed, the category and region-wise distribution of which is shown in Table 13. The recipes developed at each centre and their method of preparation are given under item 6. The nutritive value of many of these recipes is given in Tables 14-A, 14-B and 14-C.

Table 13

NUMBER OF RECIPES DEVELOPED BY VARIOUS CENTRES

Centre : Type of recipe	Coimbatore	Gandhi-gram	Hyderabad	New Delhi	Poona	West Bengal	All Centres
Category I (Home-made instant-mixes)	6	11	2	—	—	—	19
Category II (Easily cooked at home)	12	8	9	8	2	5	44
Category III (For commercial processing)	2	4	5	5	2	1	19
All categories	20	23	16	13	4	6	82

Table 14a

WEANING FOODS WHICH CAN BE PREPARED AT HOME

Sl. No.	Name of recipe	Cereals and millets		Pulses and Nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
	Recipes developed at Coimbatore Centre												
1.	Greens jaggery drink	—	—	—	—	Amaranth	50	Jaggery Water	17 $2\frac{1}{2}$ cups	67	2.1	87	—
2.	Cholam porridge	Cholam	25	Roasted Bengal gram dehusked	25	—	—	Jaggery Water	20 $1\frac{1}{2}$ cups	70	8.3	256	—
3.	Sago kanji	—	—	Roasted Bengal gram dal	25	—	—	Sago Jaggery Water	30 40 2 cups	95	5.8	352	—
4.	Ragi kali	Ragi flour	25	Roasted Bengal gram dal flour	25	—	—	Jaggery Salt Water	20 a pinch $2\frac{1}{4}$ cups	70	7.5	252	—
5.	Cholam kesari	Cholam flour	30	Roasted Bengal gram dal flour	30	—	—	Jaggery Water	31 $2\frac{1}{2}$ cups	91	9.4	324	—

Table 14a (Contd)

Sl. No.	Name of recipe	Cereals and millets Name	Qty. (g)	Pulses and nuts Name	Qty. (g)	Vegetables Name	Qty. (g)	Others Name	Qty. (g)	Weight of total raw ingredients (g)	Nuiritive Value Proteins (g)	Calories	NDP Cals %
						Recipes developed at Coimbatore Centre							
6.	Rice uppma	Parboiled rice	25	Green gram dal	25	Onion	13	Green chillies	1	91	8.5	332	—
						Drumstick leaves	10	Mustard oil	1				
								Ground-nut oil	16				
								Salt	a pinch				
								Water	2 cups				
7.	Ragi adai (sweet)	Ragi flour	30	Roasted Bengal gram dal flour	12	—	—	Jaggery	17	72	5.0	301	—
								Coconut scrapings	5				
								Ground-nut oil	8				
								Water tea-spoon-ful	3				
8.	Cholam adai (sweet)	Cholam flour	25	Roasted Bengal gram dal flour	20	—	—	Jaggery	18	76	7.4	325	—
								Coconut scrapings	5				
								Ground-nut oil	8				
								Water tea-spoonful	4				

Table 14a (Contd.)

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutrittive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
						Recipes developed at Coimbatore Centre							
9.	Ragi adai (karam)	Ragi flour	25	Red gram dal Bengal gram dal Green gram dal	9 9 9	Onion	13	Ground-nut oil	10	75	.0	266	—
								Chilly powder, curry leaves & salt	to taste				
10.	Cholam adai (karam)	Cholam flour	25	Red gram dal Green gram dal Bengal gram dal	9 9 9	Onion	13	Ground-nut oil	10	75	8.3	271	—
								Curry leaves	a few				
								Chilly powder & salt	to taste				
								Water	$\frac{1}{4}$ cup				
11.	Ragi puttu	Ragi flour	30	Green gram dal	25	—	—	Coconut scrapings	5	82	8.5	291	—
								Jaggery	22				
								Salt	a pinch				
								Water	$1\frac{1}{2}$ cups				

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Table 14a (Contd.)

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
						Recipes developed at Coimbatore Centre							
12.	Cholam puttu	Cholam flour	30	Roasted Bengal gram dal flour	25	—	—	Coconut scrapings	5	82	9.0	303	—
								Jaggery	22				
								Salt	a pinch				
								Water	2 cups				
						Recipes developed at Gandhigram Centre							
1.	Potato pudding	—	—	Horse gram dal powder	25	Dried potato chips powder	60	Baking soda	½ spoon ful	115	21.5	254	6.8
				Groundnut cake powder	30								
2.	Ragi pudding	Ragi flour	50	Bengal gram dal flour	12.5	—	—	Jaggery	20	95	11.5	343	6.9
								Baking soda	½ tea-spoon ful				
				Groundnut cake powder	12.5								
3.	Cholam pudding	White cholam flour	30	Groundnut cake powder	15	—	—	Food yeast	5	62.5	19.9	437	7.8
								Jaggery	12.5				
								Cumin-seed	¼ tea-spoon ful				

Table 14a (Contd)

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
					Recipes developed at Gandhigram Centre								
4.	Thenai adai	Roasted theni flour	25	Roasted groundnut cake powder	25	—	—	Jaggery Dalda	20 $\frac{1}{8}$ tea-spoon ful	70	13.0	258	6.2
5.	Thenai iddly	Thenai	100	Bengal gram dal	50	—	—	Salt	to taste	150	22.7	517	6.3
6.	Cholam iddly	White cholam grains	100	Cow gram dal	50	—	—	Salt	to taste	150	22.7	512	6.5
7.	Samai balls	Sami flour	60	Black gram dal flour	30	—	—	Salt	to taste	90	12.0	308	4.7
8.	Cholam soru with dal	White cholam	100	Red gram dal flour (raw)	30	—	—	Tomato	30	160	17.3	462	7.5
					Recipes developed at Hyderabad Centre								
1.	Khicheri	Parboiled rice	75	Lentils	50	Spinach	100	Oil Salt	10 to taste	235	19.3	549	5.3
2.	Soup	Rice	75	Bengal gram dal	50	Amaranth Tomato	50 100	Oil Salt	5 to taste	280	18.2	535	6.4
3.	Vegetable kheer	Wheat flour	30	Roasted Bengal gram	60	Spinach	30	Jaggery	70	190	17.9	600	4.9

Table 14a (Contd)

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
	Recipes developed at Hyderabad Centre												
4.	Khaman dhokla	Parboiled rice	40	Bengal gram dal	50	Amaranth	50	Oil	5	170	21.0	480	6.2
								Salt	to taste				
				Black gram dal	25			Mustard	a few				
5.	Bengal gram dal khicheri	Parboiled rice	50	Green gram dal	25	—	—	Ambat chukka	20	150	20.8	495	5.6
				Roasted Bengal gram	50								
6.	Sweet dal	Rice	30	Red gram dal	60	Spinach	30	Jaggery	60	180	14.2	544	5.3
7.	Chukka khicheri	Rice	75	Red gram dal	50	Potato		Chukka bhaji	50	225	17.6	486	5.5
								Salt	to taste				
8.	Keera Pongal	Rice	40	Lentils	50	Amarnth	20	Jaggery	45	155	16.1	531	4.5
9.	Chapa annam (Fish and rice)	Rice	90	—	—	—	—	Fish	60	160	18.3	468	—
								Oil	10				
								Salt	to taste				
								Turmeric	a little				
								Black pepper	a little				

Table 14a (Contd.)

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
	Recipes dcveloped at New Delhi Centre												
1.	Mixed vegetables khicheri	Details not available											
2.	Bajra khicheri (sweet and savoury)												
3.	Bajra dalia with groundnut milk												
4.	Paushtik roti												
5.	Banana roti												
6.	Wheat dalia with groundnut milk												
7.	Mixed laddoo												
8.	Rajkura laddoo												
	Recipes developed at Poona Centre												
1.	Kanji of wheat flour and Bengal gram flour	Wheat flour	2 parts by weight (8 g.)	Bengal gram flour	1 part by weight (4 g)	—	—	Jaggery	2 parts by weight (8 g.)	20	3-4	140-150	—
2.	Semi-solid preparations of Amaranth and jaggery	—	—	Amar-anth seeds	25	—	—	Jaggery	15	40	3.5	135	—

Table 14a (Contd.)

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingrediets (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
						Recipes developed at West Bengal Centre							
1.	Khicheri of rice, dal and vegetables	Rice	50	Lentil	50	Potato Green papaya	60 60	Oil	15	235	17.0	554	4.0
2.	Chapaties with atta, Bengal gram powder and leafy vegetables	Atta	90	Roasted Bengal gram	30	Green leafy vegetables	100	—	—	220	21.6	464	6.4
3.	Porridge of wheat Dalia	Wheat Dalia	90	—	—	—	—	Sugar Milk	45 85	220	14.3	591	5.1
4.	Khicheri of wheat dalia	Details not available									19.4	555	4.6

Table 14b

READY TO USE INFANT FOODS

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
	Recipes developed at Coimbatore Centre												
1.	Cholam-Bengal gram mix	Roasted cholam flour	30	Roasted Bengal gram dal	20	—	—	Jaggery	20	80	10.9	311	6 1
				Roasted ground nut	10								
2.	Cholam-Green gram mix	Roasted cholam flour	30	Roasted greengram dal	20	—	—	Jaggery	20	80	11.3	307	5.7
				Roasted ground nut	10								
3.	Ragi-Bengal gram mix	Roasted ragi flour	30	Roasted Bengal gram dal	20	—	—	Jaggery	20	80	9.9	304	6.8
				Roasted ground nut	10								
4.	Ragi-Green gram mix	Roasted ragi flour	30	Roasted greengram dal	20	—	—	Jaggery	20	80	10.3	281	6.6
				Roasted ground nut	10								

Table 14b (Contd.)

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
5.	Maize-Bengal gram mix	Maize	30	Roasted Bengal gram dal flour	20	—	—	Jaggery	20	80	11.1	309	6.3
				Roasted ground nut	10								
6.	Maize-Green gram mix	Maize	30	Roasted greengram dal	20	—	—	Jaggery	20	80	11.5	305	6.6
				Roasted ground nut	10								
				Recipes developed at Gandhigram Centre									
1.	Ground nut cake porridge	—	—	Roasted ground nut cake power	50	—	—	Palm jaggery	25	90	24.0	332	5.7
				Roasted greengram dal flour	15								
2.	Ground nut cake powder/Jack fruit seed powder porridge	—	—	Roasted Jack fruit seed flour	25	—	—	Palm jaggery	25	100	22.0	318	—
				Roasted ground nut cake flour	50								

Table 14b (Contd.)

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutrittive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
					Recipes developed at Gandhigram Centre (Contd.)								
3.	Ground nut cake powder/and dried green plantain powder/porridge	—	—	Roasted groud nut cake flour	25	Raw plantain flour	50	Palm jaggery	25	125	18.0	379	7.6
				Bengal gram	25								
4.	Cholam porridge	Roasted Cholam flour	50	Roasted green gram dal flour	15	—	—	Jaggery	20	110	15.8	447	9.2
				Sesame cake flour	25								
5.	Cambu porridge	Roasted Cambu flour	50	Green gram gram dal flour	15	—	—	Jaggery	20	110	19.6	357	7.3
				Ground nut cake flour	25								
6.	Ragi porridge	Roasted Ragi flour	50	Roasted Bengalgram dal flour	15	—	—	Jaggery	20	110	17.1	395	7.1
				Roasted ground nut cake powder	25								

Table 14b (Contd.)

Sl. No.	Name of recipe	Cereals and millets		Pulses and Nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
				Recipes developed at Gandhigram Centre (Contd.)									
7.	Thenai porridge	Roasted Thenai flour	50	Roasted Mochai dal flour	15	—	—	Jaggery	20	110	20.5	393	8.0
				Roasted ground nut cake flour	25								
8.	Samai porridge	Roasted Samai flour	50	Roasted Bengal-gram dal flour	25	—	—	—	—	100	16.8	398	8.5
				Roasted Sesame cake powder	25								
9.	Tapioca porridge	—	—	Roasted blackgram dal flour	30	Roasted Tapioca vathal flour	40	Salt	to taste	135	22.8	382	6.7
				Roasted ground nut cake	35	Drumstick pulp raw without seeds	30						

Table 14b (Contd.)

Sl No.	Name of recipe	Cereals and millets Name	Qty. (g)	Pulses and nuts Name	Qty. (g)	Vegetables Name	Qty. (g)	Others Name	Qty. (g)	Weight of total raw ingredients (g)	Nutritive Value Proteins (g)	Calories	NDP Cals %
				Recipes development at Gandhigram Centre (Contd.)									
10.	Ragi malted porridge	Malted Ragi flour	50	Roasted ground nnt cake flour	25								
				Roasted horsegram flour	15	—	—	Palmjaggery	15	105	17.3	414	7.0
11.	Sprouted foxgram porridge	Sprouted fox gram flour raw	30	Roasted ground nut flour	10	—	—	Plantain ripe	25	80	11.0	217	8.5
				Recipes developed at Hyderabad Centre									
1.	Bajra infant food	Bajra	60	Greengram dal Ground nut Til seeds	15 10 5	—	—	Skim milk powder	10	100	18.6	389	8.0
								Sugar or Salt	to taste				
2.	Ragi infant food	Ragi	60	Greengram dal Ground nut Til seeds	15 10 5			Skimmed milk powder	10	100	16.0	369	8.0
								Sugar or Salt	to taste				

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Table 14c

RECIPES FOR COMMERCIAL PROCESSING

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
						Recipes developed at Coimbatore Centre							
1.	Ragi leaf cake	Ragi flour	25	Greengram dal	25	—	—	Jaggery	20	80	8.4	290	—
								Coconut scrapings	10				
								Cardamom powder	a little				
								Salt	a plnch				
								Water	1 cup				
2.	Cholam flour	Cholam flour	21	Greengram dal	25	—	—	Jaggery	20	80	9.2	295	—
								Coconut scrapings	10				
								Cardamom powdcr	a little				
								Salt	to taste				
								Water	1 cup				
						Recipes developed at Gandhigram Centre							
1.	Ground nut cake biscuits	White cholam flour	100	Ground nut cake powdor raw	100	—	—	Jaggery or Brown sugar	70	290	51.3	1193	6.4
								Baking soda	a pinch				
								Dalda	20				

Table 14c (Contd.)

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
				Recipes developed at Gandhigram Centre (Contd.)									
2.	Ragi biscuits	Ragi flour	100	Foxgram flour	100	—	—	Brown sugar Dalda Baking soda a pinch	70 20	290	30.9	1117	6.3
3.	Samai biscuits	Samai flour	100	Ground nut cake	100	—	—	Brown sugar Dalda Baking soda a pinch	70 20	290	48.6	1184	5.9
4.	Ground nut cake toffee	—	—	Roasted Groundnut cakepowder Bengalgram dal roasted	100 30	—	—	Palm jaggery	50	180	48.7	661	6.0
				Recipes developed at Hyderabad Centre									
1.	Cowgram biscuits	Maida	100	Cowgram flour (dehusked)	100	—	—	Sugar Vanaspati Salt Baking Soda	80 20 ½ tea-spoon ful ½ tea-spoon ful	300	12.0	—	4.7

Table 14c (Contd.)

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Clas %
						Recipes developed at Hyderabad Centre (Contd.)							
2.	Bengalgram biscuits	Wheat flour	100	Bengalgram	100	—	—	Sugar Vanaspati Salt and Baking Soda	80 20 ½ tea-spoon full each	300	11.0	—	5.1
3.	Horsegram biscuits	Maida flour	100	Horsegram flour (dehusked)	100	—	—	Sugar Vanaspati Salt and Baking Soda	80 20 ½ tea-spoon ful each	300	11.0	—	4.9
4.	Groundnut biscuits	Roasted wheat flour	100	Roasted ground nuts	100			Sugar Vanaspati Salt and Baking Soda	80 20 ½ tea-spoon ful	280	13.0	—	5.4
5.	Bengalgram sesame biscuits	Maida	60	Bengalgram flour sesame	45 60	—	—	Sugar Vanaspati Salt Baking Soda powder	75 30 a pinch ½ tea-spoon ful	270	—	—	5.3

Table 14c (Contd)

Sl. No.	Name of recipe	Cereals and millets		Pulses and nuts		Vegetables		Others		Weight of total raw ingredients (g)	Nutritive Value		
		Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)	Name	Qty. (g)		Proteins (g)	Calories	NDP Cals %
	Recipes developed at New Delhi Centre												
1.	Bengalgram ground nut chikki	Details not available											
2.	Atta Besan Burfi												
3.	Carrot Burfi												
4.	Wheat flour biscuits (sweet)												
5.	Bajra biscuits (sweet and savory)												
	Recipes developed at Poona Centre												
1.	Laddus of groundnut and gingelly seeds	—	—	Groundnuts Gingelly seeds	12 6	—	—	Jaggery	12	30	4.1	145	—
2.	Amaranth chikki	—	—	Amaranth seeds Ground nuts	12–14 6–7	—	—	Jaggery	12–14	30–35	3.5–4.0	120–130	—
3.	Bengalgram Burfi (with jaggery)	—	—	Roasted Bengalgram powder	100	—	—	Jaggery	100	200	—	—	4.4

In addition to the recipes indicated here, mention may be made of the usefulness of a few simple household practices that can be easily adopted by mothers for feeding their young children. These recipes are capable of being prepared in a short time without much need for cooking. Slices of bread chapathies soaked and mashed in hot sugared milk or gravy, roasted wheat flour or soji cooked ln either milk or sweetened water to soft consistency are useful recipes.

Centrally processed preparations like Balahar and Miltone may also be expected to find use among some sections of the community.

5. 1. Acceptability of recipes

There appeared to be no published reports on any standardized procedure which can be adopted to judge whether a given recipe is acceptable or not. Two sets of criteria were, therefore, used to determine the acceptability of the recipes.

5. 1. 1. Criteria for acceptability by children : (a) The percentage of children who refuse the recipe, should not exceed 25; (b) The child should be able to consume the recipe in amounts which would provide about 300 calories and 6–8 g. protein, this being the extent of calorie deficit in their present diets. This amount must be consumed *in addition* to their present diets.

5. 1. 2. Criteria for acceptability by mothers : In addition to the child accepting the recipe, it was considered very important that they should be acceptable to the mothers as well. For this purpose, the following criteria were used :

(a) The mother liked the taste of the recipe,

(b) The method of preparation was simple and did not take more than 15 minutes,

(c) The preparation kept well for at least 12 hours after preparation without developing oddflavour or taste, and

(d) The child did not develop any side-effects like diarrhoea and vomiting after consuming the preparation.

While this system was followed in four of the six regions—Delhi, Poona, Hyderabad and Calcutta, in Coimbatore acceptability was determined by using a scorecard method. In Gandhigram, an opinion poll of mothers was obtained to determine acceptable recipes.

6. RECIPES DEVELOPED AT VARIOUS CENTRES

6. 1. Recipes developed at Coimbatore

6. 1. 1. Weaning foods which can be prepared at home :

6. 1. 1. 1. Greens jaggery drink

Amaranthus	... 50 g.
Jaggery	... 17 g.
Water	... $2\frac{1}{2}$ (cups)

Method : Water is boiled and washed greens are added. It is cooked for 15 minutes. Cooking water is strained. Powdered jaggery is added and mixed. The drink is boiled for 2 minutes.

6. 1. 1. 2. Cholam porridge

Cholam	... 25 g.
Roasted Bengal gram dehusked	... 25 g.
Jaggery	... 20 g.
Water	... $1\frac{1}{2}$ (cups)

Method : Roasted Bengal gram is powdered. Cholam is soaked for 3 hours. The two are ground to a paste. One and one-fourth cups of water is added and the milk is strained. The milk is boiled. A batter from roasted Bengal gram powder with $\frac{1}{4}$th cup of boiled water is prepared. The batter is added to the boiling milk with continuous stirring. It is cooked for 10 minutes and jaggery powder is added and mixed. Then it is kept for 2 minutes.

6. 1. 1. 3. Sago kanji

Sago	... 30 g.
Roasted Bengal gram	... 25 g.
Jaggery	... 40 g.
Water	... 2 (cups)

Method : Sago is roasted silghtly and made into granules, Roasted Bengal gram is powdered. One and a half cups of water is boiled. Sago is added and cooked for 10 minutes. A batter is prepared of roasted Bengal gram flour with half a cup of water. The batter is poured into the cooked sago and continuously stirred. Then it is cooked for 10 minutes. Jaggery is added and mixed. It is boiled for 5 minutes.

6.1.1.4. Ragi kali

Ragi flour	... 25 g.
Roasted Bengal gram dal flour	... 25 g.
Jaggery	... 20 g.

Salt	...	a pinch
Water	...	$2\frac{1}{4}$ (cups)

Method: One cup of water is boiled. Ragi flour and roasted Bengal gram flour are mixed and salt is added to the water. A batter is prepared by mixing the flours together with salt water. The batter is added gradually to the boiling water with continuous stirring. The product is cooked for 10 minutes. Jaggery powder is added and mixed well and cooked for 5 minutes.

6. 1. 1. 5. Cholam kesari

Cholam flour	...	30 g.
Roasted green dal flour	...	30 g.
Jaggery	...	31 g.
Water	...	$2\frac{1}{2}$ (cups)

Method : One cup of water is boiled. A batter is prepared by mixing cholam flour and green gram flour together with 1/4th cup of water. The batter is poured into the boiling water gradually and stirred. Jaggery powder is added and mixed and cooked for 5 minutes. The product is cooled and cut to diamond shapes.

6. 1. 1. 6. Rice uppuma

Parboiled rice	...	25 g.
Green gram dhal	...	25 g.
Onion (big)	...	13 g.
Drumstick leaves	...	10 g.
Green chillies	...	1 g.
Mustard	...	1 g.
Groundnut oil	...	16 g.
Salt	...	a pinch
Water	...	2 (cups)

Method : Rice and dhal are roasted and broken into granules. Roasted green gram dhal is cooked with $\frac{3}{4}$th cup of water and mashed, The oil is heated and seasoned with mustard, chopped onion and chillies. About $\frac{3}{4}$th cup of water is added to the seasoned ingredients. Salt is added and mixed. The roasted rice granules are sprinkled with water and continuously stirred. It is cooked for 10 minutes.

6. 1. 1. 7. Ragi Adai – Sweet

Ragi flour	...	30 g.
Roasted Bengal gram dhal flour	...	12 g.
Jaggery	...	17 g.
Coconut scrapings	...	5 g.
Oil (groundnut)	...	8 g.
Water (teaspoonfuls)	...	3 g.

Method: Jaggery is dissolved in water, Ragi flour and roasted Bengal gram dhal flour are mixed together with the jaggery water. Coconut scrapings are added

and mixed. A thick dough is prepared, and the adai is prepared on a greased iron pan (Tawa).

6. 1. 1. 8. Cholam Adai – Sweet

Cholam flour	... 25 g.
Roasted Bengal gram dhal flour	... 20 g.
Jaggery	... 18 g.
Coconut scrapings	... 5 g.
Oil	... 8 g.
Water (teaspoonfuls)	... 4

Method : Jaggery is dissolved in water, Cholam flour and roasted Bengal gram dhal flour are together mixed with jaggery water. Coconut scrapings are added and mixed. A thick dough is prepared, then adai is prepared on a greased iron pan (Tawa).

6. 1. 1. 9. Ragi Adai (Karam)

Ragi flour	... 25 g.
Redgram dhal	... 9 g.
Bengal gram dhal	... 9 g.
Green gram dhal	... 9 g.
Chillie powder	... to taste
Curry leaves	... a few
Salt	... a pinch
Onion (big)	... 13 g.
Groundnut oil	... 10 g.

Method : All the dhals are mixed and washed, than soaked for 2 hours. The dhal mixture is ground with salt and chopped onion to a coarse consistency. Chillie powder is added to the ragi flour. Water is added to the ragi flour and mixed. The dhal mixture is added to the above and mixed. The adais are prepared on a greased iron pan (Tawa).

6. 1. 1. 10. Cholam Adai (Karam)

Cholam flour	... 25 g.
Redgram dhal	... 9 g.
Greengram dhal	... 9 g.
Bengal gram dhal	... 9 g.
Onion (big)	... 13 g.
Groundnut oil	... 10 g.
Curry leaves	... a few
Water (cup)	... $\frac{1}{4}$
Chillie powder	... to taste
Salt	... a pinch

Method : All the dhals are mixed and washed, then soaked for 2 hours. The dhal is ground with salt and chopped onion to a coarse consistency. Chillie powder is added to the cholam flour. Water is added to the cholam flour and mixed. The dhal mixture is added to the above and mixed. The adais are prepared on a greased iron pan (Tawa).

6. 1. 1. 11. Ragi puttu

Ragi flour	...	30 g.
Green gram dhal	...	25 g.
Coconut scrapings	...	5 g.
Jaggery	...	22 g.
Salt	...	a pinch
Water	...	½ (cup)

Method : Jaggery syrup is prepared to thread stage by boiling 1/8th cup of water with jaggery. The dhal is cooked in ¾th cup of water. Both are mixed. Coconut scrapings are added and mixed well and contents ramoved from fire, Raw ragi flour is sifted with a fine sieve. Salt is added to the ragi flour and mixed. About 1/8th cup of water is sprinkled to the ragi flour and mixed. The dhal mixture is added and mixed well. The product is steamed for 15 minutes and served.

6. 1. 1. 12. Cholam puttu

Cholam flour	...	30 g.
Roasted Bengal gram dhal flour	...	35 g.
Coconut scrapings	...	5 g.
Jaggery	...	22 g.
Salt	...	a pinch
Water	...	2 (cups)

Method : Raw cholam flour is sifted with fine sieve, The cholam flour and Bengal gram flour are mixed together with coconut scrapings and salt. About two teaspoonfuls of water is sprinkled and mixed, and steamed for 15 minutes. Jaggery powder is added and mixed well.

6. 1. 2. Recipes for biscuits :

6. 1. 2. 1. Ragi leaf cake

Ragi flour	...	25 g.
Green gram dhal	...	25 g.
Jaggery	...	20 g,
Coconut scrapings	...	10 g.
Cardamom powder	...	a little
Salt	...	a pinch
Water	...	1 (cup)

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Method :

Preparation of poornam

Roasted green gram dhal is cooked with $\frac{1}{2}$ cup of water and mashed. The cooked dhal is mixed with coconut scrapings, jaggery and cardamom powder.

Preparation of leaf cake

Salt is added to the ragi flour and mixed. About 1/4th cup of boiled water is sprinkled and dough is prepared by kneading. Small balls of one inch diameter are made and spread on to a plantain leaf to a round shape of about 1/8th inch thickness. Then a spoonful of dhal mixture is placed at the centre of the flattened dough and folded to get a half circle.

6. 1. 2. 2. Cholam leaf cake

Cholam flour	...	25 g.
Green gram dhal	...	25 g.
Jaggery	...	20 g.
Coconut scrapings	...	10 g.
Cardamom	...	a little
Salt	...	a pinch
Water (cup)	...	1

Method : Same as for preparation of leaf cake,

6. 1. 3. Ready made mixes developed :

1. Cholam Bengal gram mix
2. Cholam green gram mix
3. Ragi Bengal gram mix
4. Ragi green gram mix
5. Maize Bengal gram mix
6. Maize green gram mix

Cereal flour	...	30 g.
Pulse flour	...	20 g.
Roasted groundnuts	...	10 g.
Jaggery	...	15 g.

Method : Roasted groundnuts and jaggery are powdered and mixed with roasted cereal-pulse flour. Hot water is added to this mix and porridge is prepared or boiled cooked water is added and balls are prepared.

6. 2. Recipes developed at Gandhigram

6. 2. 1. Weaning foods which can be prepared at home :

6. 2. 1. 1. Potato pudding

Dried potato chips powder	...	60 g.
Horse gram dhal powder	...	25 g.

Groundnut cake powder	....	30 g.
Baking soda	...	a pinch (half teaspoonful)

Method: The flours are mixed and a semi-solid batter is prepared. Oil or dalda is smeared on an aluminium pan and the batters is poured into the oiled pan. The vessel is covered with a greased paper and tied up and steamed.

6. 2. 1. 2. Ragi pudding

Ragi flour	...	50 g.
Bengal gram dhal flour	...	12.5 g.
Groundnut cake powder	...	12.5 g.
Jaggery	...	20 g.
Baking soda	...	a pinch

Method: Same as for preparation of Potato pudding.

6. 2. 1. 3. Cholam pudding

White cholam flour	...	30 g.
Groundnut cake powder	...	15 g.
Food Yeast	...	5 g.
Jaggery	...	12.5 g.
Cumin seeds	...	1/4th teaspoonful

Method: Same as for preparation of Potato pudding

6. 2. 1. 4. Thenai Adai

Thenai flour roasted	...	25 g.
Groundnut cake powder roasted	...	25 g.
Jaggery	...	20 g.
Dalda	...	1/8th teaspoonful

Method: The dough is prepared with jaggery syrup and small balls are made and spread in rounds or squares on the palm. The rounds are placed on a greased hot iron plate. They are kept turning over and over till cooked.

6. 2. 1. 5. Thenai iddly

Thenai	...	100 g.
Bengal gram dhal	...	50 g.
Salt	...	to taste (enough for 8 iddlies)

Method: The thenai grains and Bengal gram dhal are ground and mixed to a thick batter and kept overnight. In the morning iddly moulds are filled up and steamed till they are well cooked.

6. 2. 1. 6. Cholam iddly

White cholam grains	...	100 g.
Cow gram dhal	...	50 g.
Salt	...	to taste (for 8 iddlies)

Method : The grains and dhal are soaked for a few hours. They are ground together into a fine paste in a stone mortar. The paste is kept overnight. The thick batter is poured in iddly moulds and steamed till it is well cooked.

6. 2. 1. 7. Samai Balls

Samai flour	...	60 g.
Black gram dhal flour	...	30 g.
Salt	...	to taste

Method: The dhal is cooked till soft and salt is added. The samai flour is mixed in water to a thick paste and added to the mashed dhal. It is cooked with just enough water, poured into a plate and while still warm, balls are made.

6. 2. 1. 8. Cholam soru with dhal

White cholam	...	100 g.
Redgram dhal flour (raw)	...	30 g.
Tomato	...	30 g. (Blanched and the juice extracted and sieved)
Salt	...	to taste

Method: The cholam grains are cooked and when it is well done, the dhal powder is added and cooked well for 20 minutes. It is removed from fire and tomato juice is sprinkled. It is served warm to the child.

6. 2. 2. Ready-to-use infant foods :

6. 2. 2. 1. Groundnut cake porridge

Groundnut cake powder roasted	...	50 g.
Green gram dhal flour roasted	...	15 g.
Palm jaggery	...	25 g.

Method: The two flours are mixed in hot water and a semi-solid batter is prepared. Jaggery is prepared in the form of a syrup. The semi-solid batter is added to the boiling syrup and kept stirred. It is boiled for 10–15 minutes in an open vessel over low fire. It is served to the infants before it gets cold.

6. 2. 2. 2 Groundnut cake powder/Jack fruit seed powder/porridge

Jackfruit seed flour (roasted)	—	25 g.

Groundnut cake flour	... 50 g.
Palm jaggery	... 25 g.

Method: Same as for preparation of groundnut cake powder.

Preparation of jack fruit seed flour

Jack fruit seeds are peeled of the skins and sliced thin and washed repeatedly in cold water. It is boiled for 15 minutes and dried in sun. The dried seeds are ground to flour. The flour can be kept for days, if kept free from dampness.

6. 2. 2. 3. Groundnut cake powder and Dried green plantain powder/porridge

Plantain flour (raw)	... 50 g.
Groundnut cake flour (roasted)	... 25 g.
Bengal gram	... 25 g.
Palm jaggery	... 25 g.

Method: Same as for preparation of groundnut cake powder.

Preparation of plantain powder

Raw plantains are peeled and sliced and are well washed and sun dried. The dried plantain chips are powdered in a grinder. The powder can be kept for weeks, if kept dry. Plantain is largely available and also contribute to acceptability and palatability in recipes. The protein value is increased by the added groundnut cake powder and Bengalgram flour.

6. 2. 2. 4. Cholam porridge

Cholam flour (roasted)	... 50 g.
Green gram dhal flour (roasted)	... 15 g.
Sesame cake flour	... 25 g.
Jaggery	... 20 g.

Method: Jaggery solution is prepared and boiled. The roasted flours are mixed and a batter is made with hot water. The hot batter is poured in small quantities at a time into the boiling jaggery solution, stirring to a uniform mixture. The mixture is boiled for 10 to 15 minutes. It is removed from the fire and served warm to the child as one feed.

6. 2. 2. 5. Cambu porridge

Cambu flour (roasted)	... 50 g.
Green gram dhal flour	... 25 g.
Groundnut cake flour	... 22 g.
Jaggery	... 20 g.

Method: Same as for other porridges.

6. 2. 2. 6. Ragi porridge

Ragi flour roasted	...	50 g.
Bangalgram dhal flour roasted	...	15 g.
Groundnut cake powder roasted	...	25 g.
Jaggery	...	20 g.

Method : Same as for other porridges.

6. 2. 2. 7. Thenai porridge

Thenai flour roasted	...	50 g.
Mochai dhal flour roasted	...	15 g.
Groundunt cake flour roasted	...	25 g.
Jaggery	...	20 g.

Method : Same as for other porridges.

6. 2. 2. 8. Samai porridge

Samai flour roasted	...	50 g.
Black gram dhal flour roasted	...	25 g.
Sesame cake powder roasted	...	25 g.

Method : Same as for other porridges.

6. 2. 2. 9. Tapioca porridge

Tapioca vathal flour roasted	...	40 g.
Blackgram dhal flour roasted	...	30 g.
Groundnut cake flour roasted	...	35 g.
Drumstick pulp raw without seeds.	...	30 g.
Salt	...	to taste

Method: The drumstick is cut. The pulp is taken and it is cooked. When it is almost cooked, the mixture of roasted powders are added. The boiling is continued till it is well cooked.

6. 2. 2. 10. Malted Ragi porridge

Malted Ragi flour (raw)	...	50 g.
Groundnut cake flour roasted	...	25 g.
Horsegram flour roasted	...	15 g.
Palm jaggery	...	15 g.

Method : Same as for preparation of groundnut cake porridge.

Preparation of malted Ragi

Ragi is kept between wet gunnies for about 48-72 hours till it is sprouted well. It is dried in sun and is cleaned free from all extraneous matter. It is ground to flour.

6. 2. 2. 11. Sprouted foxgram porridge

Sprouted foxgram flour (raw)	... 30 g.
Groundnut cake flour roasted	... 10 g.
Palm jaggery	... 15 g.
Plantain (ripe)	... 25 g. (half plantain)

Method : Items 1 and 2 are mixed and a semi-solid batter is prepared. The mashed plantain is added and stirred well. The jaggery syrup is prepared and boiled. The mixture of flour and plantain are added to the syrup and cooked well.

6. 2. 3. Recipes for commercial processing

6. 2. 3. 1. Groundnut cake biscuits

Groundnut cake powder (raw)	... 100 g.
White cholam flour	... 100 g.
Jaggery or brown sugar	... 70 g.
Baking Soda	... a pinch
Dalda	... 20 g.

(for about 50 biscuits)

Method : 100 g. each of groundnut cake powder and cholam are mixed. Brown sugar is added and mixed again with a little water and baking powder. It is made into a stiff dough with dalda. The dough is rolled into 1/4" thick chapathies which are cut into round or square pieces and baked.

6. 2. 3. 2. Ragi biscuits

Ragi flour	... 100 g.
Foxgram dhal flour	... 100 g.
Brown sugar	... 70 g.
Dalda	... 20 g.
Baking soda	... a pinch

(for about 50 biscuits)

Method : Same as for preparation of groundnut cake biscuits.

6. 2. 3. 3. Samai biscuits

Samai flour	... 100 g.
Groundnut cake flour	... 100 g.
Brown sugar	... 70 g.
Dalda	... 20 g,
Baking soda	... a pinch

(for about 50 biscuits)

Method : Same as for preparation of groundnut cake biscuits.

6. 2. 3. 4. Croundnut cake toffee

Groundnut cake powder roasted	...	100 g.
Bengalgram dhal powder roasted (or green gram dhal, red gram dhal, foxgram dhal powders in same amounts)	...	30 g.
Palm jaggery	...	50 g.

Method : The jaggery syrup is prepared and when the syrup is thickened to the "thread" stage, the mixture of powders are added and stirred well. It is poured on a greased plate and is cut into desired shape.

6. 3. Recipes developed at Hyderabad

6. 3. 1. Weaning foods which can be prepared at home :

6. 3. 1. 1. Khicheri

Parboiled rice	...	75 g.
Lentils	...	50 g.
Spinach	...	100 g.
Oil	...	10 g.
Salt	...	to taste

Method : Cooked rice and dhal are mashed together. Spinach puree is prepared and added to the rice dhal mixture along with salt and seasoned with heated oil.

6. 3. 1. 2. Soup

Rice	...	75 g.
Bengal gram dhal	...	50 g.
Amaranth	...	50 g.
Tomato	...	100 g.
Oil	...	5 g.
Salt	...	to taste

Method : Dhal and rice are boiled together till cooked very soft. Amaranth and tomatoes are boiled, mashed and strained through a sieve. All ingredients are mixed, and salt added to taste. It is cooked for a few minutes and seasoned with oil.

6. 3. 1. 3. Vegetable kheer

Wheat flour	...	30 g.
Roasted Bengal gram	...	60 g.
Spinach	...	30 g.
Jaggery	...	70 g.

Method Roasted Bengal gram dhal is powdered and mixed with roasted wheat flour. The mix is made into a batter with jaggery syrup. Spinach is boiled, mashed and strained through a sieve. Spinach puree is added to the whole mixture and cooked for a few minutes with continuous stirring till it becomes semi-solid.

These three recipes have been tested for their acceptability among the children, and acceptability found to be good.

6. 3. 1. 4. Khaman Dhokla

Bengal gram dhal	...	50 g.
Black gram dhal	...	25 g,
Parboiled rice	...	40 g.
Amaranth leaves	...	50 g.
Oil	...	5 g.
Salt	...	to taste
Mustard	...	a few

Method: Bengal gram dhal, blackgram dhal and rice are soaked in water separately for a few hours. They are ground into paste separately and mixed. Salt is added and mixture allowed to ferment overnight. Amaranth leaves are chopped and added to the fermented mixture. The batter is poured into idli moulds and steamed. It may be seasoned with oil and mustard.

6. 3. 1. 5. Bengal gram dhal khicheri

Parboiled rice	...	50 g.
Green gram dhal	...	25 g.
Roasted Bengal gram	...	50 g.
Ambat chuka	...	20 g.
Oil	...	5 g.
Salt	...	to taste

Method: Rice and green dhal are boiled and mashed. Roasted Bengal gram is pawdered and added to the cooked mixture. Spinach puree is prepared and added along with salt to the mix and cooked for a few minutes. May be seasoned with hot oil.

6. 3. 1. 6. Sweet dhal

Rice	...	30 g.
Red gram dhal	...	60 g,
Spinach	...	30 g.
Jaggery	...	60 g.

Method: Rice and dhal are roasted and powdered. The two powders are mixed and made into a batter with cold water, Spinach puree is prepared and along with the batter is mixed with jaggery syrup and cooked for a few minutes.

6. 3. 1. 7. Chukka khicheri

Rice	...	75 g.
Red gram dhal	...	53 g.
Potato	...	50 g.
Salt	...	to taste

Method: Rice, dhal and potatoes are boiled and mashed. Chukka puree is prepared, all ingredients are mixed and salt added. A little butter can be added, if available.

6. 3. 1. 8. Keera Pongal

Rice	...	40 g.
Amaranth	...	20 g.
Lentils	...	50 g.
Jaggery	...	45 g.

Method: Rice and lentil are roasted separtely and powdered. Amaranth puree is prepared and added to th rice and dhal powcer. Jaggery syrup is then added to the mix and cooked for a few minutes.

6. 3. 1. 9. Chapa-annam (Fish rice)

1. Rice	...	90 g.
Salt	...	to taste
2. Fish	...	60 g.
Oil	...	10 g.
Salt	...	to taste
Turmeric	...	a little
Black pepper	...	a little

Method: Rice is cooked with a pinch of salt and mashed and strained through a sieve.

The cleaned fish is washed and all bones removed. Oil is heated in a pan and salt, turmeric and fish added. Boil with a little water till soft. Add black pepper powder. Wash the boiled fish well and mix with cooked rice.

6. 3. 2. Ready-to-use infant foods

6. 3. 2. 1. Bajra infant food

Bajra	...	60g.
Green gram dhal	...	15g.
Skim-milk powder	...	10g.
Groundnuts	...	10g.
Til seeds	...	5g.
Sugar or salt	...	to taste

Method: Bajra is well cleaned and the husk removed as completely as possible and then roasted. Green gram dhal is also roasted. Roasted groundnuts and roasted dhal are pounded to a flour in a stone mortar. All the powders are mixed and stored in air-tight bottles. Whenever required, the powder is mixed with boiling water or milk to the desired thickness. Salt or sugar is added to taste.

6. 3. 2. 2. Ragi infant food

Use 60g. of ragi instead of bajra in the above recipe.

Method: The ragi is allowed to sprout by keeping under a damp cloth for 72 hours. It is sun-dried, roasted and powdered. The rest of the procedure is same as above.

6. 3. 3. Recipes for Biscuits

6. 3. 3. 1. Cowgram biscuits

Cowgram flour (dehusked)	...	100 g.
Maida flour	...	100 g.
Sugar	...	80 g.
Vanaspati	...	20 g.
Salt	...	Half teaspoon
Baking soda	...	Half teaspoon
Yield of biscuits	...	300 g.

6. 3. 3. 2. Bengal gram biscuits

Bengalgram	...	100 g.
Wheat flour	...	100 g.
Sugar	...	80 g.
Vanaspati	...	20 g.
Salt, Baking powder	...	Half teaspoon each
Yield of biscuits	...	300 g.

6. 3. 3. 3. Horse gram biscuits

Horse gram flour (dehusked)	...	100 g.
Maida flour	...	100 g.
Sugar	...	80 g.
Vanaspati	...	20 g.
Salt, Baking powder	...	Half teaspoon each
Net weight of biscuits	...	300 g.

6. 3. 3. 4. Groundnut biscuits

Groundnut (roasted)	...	100 g.
Wheat flour (roasted)	...	100 g.

Sugar	...	30 g.
Baking powder	...	1½ teaspoons
Salt	...	1 pinch
Net weight of biscuits	...	300 g.

6. 3. 3. 5. Bengal gram-Sesame biscuits

Bengal gram flour	...	45 g.
Maida	...	60 g.
Sesame	...	60 g.
Sugar	...	75 g.
Vanaspati	...	30 g.
Salt	...	a pinch
Baking powder	...	Half teaspoon
Net weight of biscuits	...	300 g.

General method of preparation of biscuits:

The main ingredients are roasted separately and powdered. The powder is well mixed with baking powder and salt, and a stiff dough prepared by kneading with fat, except in recipe No. 6.3.3.4. in which there is no necessity for additional fat. The dough is rolled out like chapathis and using tin-lids or any sharp instrument, is cut into desired shapes. The bits are placed on metal trays and baked on well heated sand in a covered dekchi. The biscuits are removed when golden-brown, which usually takes about 20 minutes.

6. 4. Recipes developed at Poona

6. 4. 1. Weaning foods to be prepared at home :

6. 4. 1. 1. Kanji of wheat flour and Bengal gram flour

Wheat flour	...	8 g.
Bengal gram flour	...	4 g.
Jaggery	...	8 g.

Method : Wheat flour and Bengal gram flour were roasted with ghee and mixed with powdered jaggery. The mixture was heated with water and fed as thickened feed.

6. 4. 1. 2. Semi-solid preparation of Amaranth and jaggery

Amaranth seeds	...	25 g.
Jaggery	...	15 g.

Method: Jaggery syrup is prepared by pounding jaggery with water. Roasted amaranth seeds are added to the syrup and stirred continuously until a paste is obtained.

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6. 4. 2. Recipes for commerciai processing

6. 4. 2. 1. Laddoos of groundnuts and gingelly seeds

Groundnut	...	12 g.
Gingelly seeds	...	6 g.
Jaggery	...	12 g.

Method: Roasted groundnuts and gingelly seeds were pounded with jaggery. Small balls are prepared out of the product and fed to children.

6. 4. 2. 2. Amaranth Chikki

Amaranth seeds	...	2 parts by weight
Groundnuts	...	1 part by weight
Jaggery	...	2 parts by weight

Method: A mixture of roasted amaranth seeds and roasted groundnut powder is obtained and added to the hot jaggery syrup. The mixture is spread into a thick layer from which square pieces of equal size are cut.

6. 5. Recipes developed at West Bengal

6. 5. 1. Weaning foods which can be prepared at home:

6. 5. 1. 1. Khicheri of rice, dhal and vegetables

Rice	...	50 g.
Dhal (Lentil)	...	50 g.
Potato	...	60 g.
Green papaya	...	60 g.
Oil	...	15 g.
Salt	...	to taste
Cooked quantity	...	450 g.

Method: Rice and lentils are cleaned and washed separately. Water is boiled in a dekchi, and a piece of onion, ginger, bay leaf and cardamom are added. The rice is also added and allowed to cook until it is half cooked. Lentils and vegetables are now added to the rice, and cooking is continued until the ingredients become soft. Oil and salt are added according to taste.

6. 5. 1. 2. Chapathies with atta, Bengal gram powder and leafy vegetables

Atta	...	90 g.
Roasted Bengal gram powder	...	30 g.
Green leafy vegetables	...	100 g.
Total number of chapathies	...	6

Method: Leafy vegetables are chopped and boiled with a small amount of water. The cooked vegetable is mixed with atta and roasted Bengal gram powder

into a dough and chapathies are prepared. This can also be served with a thin vegetable dhal.

6. 5. 1. 3. Porridge of wheat dalia

Wheat dalia	...	90 g.
Sugar	...	45 g.
Milk	...	90 ml.
Cooked quantity	...	540 g.

Method: Water is boiled with 2 bay leaves in it. Roasted wheat dalia is washed, added to boiling water, and allowed to cook till soft. Sugar is now added and stirred well. Boiled milk is finally added.

6. 5. 1. 4. Khicheri of wheat dalia

Wheat dalia	...	50 g.
Lentil	...	50 g.
Potato	...	60 g.
Green papaya	...	60 g.
Oil	...	15 g.
Salt	...	to taste

Method: Same as 6.5.1.1.

6. 5. 2. Recipes for commercial processing

6. 5. 2. 1. Bengal gram barfi (with jaggery)

Rosted Bengal gram powder	...	100 g.
Jaggery	...	100 g.
Total number of barfies	...	8

Method: Syrup is made with jaggery and water. Bengal gram flour is added to the syrup and mixed thoroughly. A pinch of cardamom powder is sprinkled over the prepared mixture for flavour. The mix is transferred into a greased plate and spread. After cooling, it is cut into bits of desired size.

7. METHODS TO POPULARISE USE OF RECIPES AMONG RURAL COMMUNITIES

The third phase of the study was mainly concerned with development of methods for propagating the use of the recipes developed at each centre, by the local communities, and evaluation of the methods developed. In all the centres, these took the form of feeding trials, based on the expectation that such feeding trials, when conducted along proper lines, would offer an excellent opportunity for imparting nutrition education to the parents of the children and the community on the one hand. and to demonstrate the beneficial effects of feeding on the nutritional status of children, on the other.

Considering that popularisation of recipes could be organised in a number of ways, the working party provided certain guidelines to the workers in each centre instead of a rigid study plan, as was done during the first and second phases and thus deliberately permitted flexibility in the methodology.

Each centre, therefore, developed its own method of study and procedure of evaluation. The method followed at each centre and the main findings are presented below.

7. 1. Hyderabad Centre

Two villages close to the laboratories having a population of around 5,000 with an expected pre-school population of about 600 were selected. Discussions were held with the local leaders and the co-operation of the local Women's Club and the Youth Club was obtained for purposes of organising the feeding programme. It was decided that the laboratories would meet the cost of the food materials while the community would provide the services for the entire operation of the feeding programme, e. g., procurement of raw foods, transport, actual cooking and preparation of the recipe the distribution and supervision of feeding. This contribution of the community was considered to be one of the crucial aspects of the programme, because it not only ensured community participation but also laid secure foundations for the continued success of the programme. From among the various recipes developed, the one which was found to be most acceptable, was selected. This recipe contained the following ingredients:

Wheat flour	...	30 g.
Green gram	...	20 g.
Groundnuts	...	8 g.
Sugar/Jaggery	...	20 g.

The ingredients except sugar/jaggery were roasted, made into flour, mixed with sugar or jaggery syrup and made into balls and fed to the children. All these opera-

tions were carried out by the women of the village. The children were collected daily at Balwadies in the village and the local Youth Club members organised the distribution. The supplements were distributed at a time, which did not interfere with the pattern of food consumption at home, so as to ensure that these supplements did not become replacements.

The important features of this approach are : (1) the supplement is based exclusively on local resources, which is in conformity with one of the basic objectives of the whole programme, and (2) the community is actually involved at all stages right from the procurement of the food to the distribution and would, therefore, feel a sense of active participation in it.

This approach aroused considerable interest in the community, since it centered round the welfare of children in the area. The supplementary feeding programme was carried out over a period of nearly two years.

To assess the impact of this approach on the attitude of different sections of the community served by the programme as well as on the health of the children, an evaluation of the programme was undertaken. Four neighbouring villages, where no such feeding programme was in operation, were taken up as control areas. The results are shown in Tables 15 and 16.

The prevalence of signs of protein calorie malnutrition, particularly the severe forms like kwashiorkor and marasmus, was considerably lower in the supplemented area. Also, the number of children with one or more signs of malnutrition was only a third of the number of children with such signs in the control areas. However, the prevalence of deficiency signs due to vitamin A and vitamin B complex, was not significantly different between the two groups. This was due to the fact that the supplements did not contain adequate amounts of these nutrients.

The mean values of heights and weights were slightly higher in the children who had received the supplements, but these differences were not statistically significant.

In a sub-sample of 40 children from both the experimental and control groups, dietary intake during the previous 24 hours was assessed by the oral questionnaire method. The results indicated that cereals formed the bulk of the diet and that all other foods were consumed in grossly inadequate quantities. A striking observation was that there was no difference in the food intake of children at home between the two groups, though one group received supplements which provided about 300 calories and 10 g. protein daily. This was mainly bacause the community was educated about the programme and was adequately prepared for it, as also the food supplements were given at a time which did not interfere with the time pattern of food consumption at home.

An opinion survey was carried out in the experimental area to assess the attitude of different sections of the community towards the supplementary feeding programme.

Table 15

PERCENTAGE PREVALENCE OF NUTRITIONAL DEFICIENCY SIGNS IN CONTROL AND EXPERIMENTAL CHILDREN

Nutritional deficiency signs	Experimental	Control	Level of significance
Number surveyed	159	200	between two groups
Protein Calorie Mainutrition :			
Hair Changes :			
Sparse	5.0	15.0	P∠0.01
Discoloured	6.3	15.0	P∠0.01
Easy pluckability	4.4	7.5	P∠0.30
Moon Face	5.7	6.0	N. S.
Oedema	0.0	1.5	P∠0.05
Marasmus	1.9	6.5	P∠0.02
One or more signs of Vitamin 'A' deficiency	6.3	8.5	N. S.
One or more signs of Vitamin B Complex deficiency	13.8	16.5	N. S.

Table 16

ANTHROPOMETRIC MEASUREMENTS OF CONTROL AND EXPERIMENTAL CHILDREN BY AGE

Group of Children	Age in years			
	2—3	3—4	4—5	5—6
	Height (Cm.)			
Experimental	78.3 ± 5.08 (1.136)*	84.6 ± 6.16 (1.106)	90.9 ± 4.64 (0.716)	98.7 ± 5.69 (0.700)
Control	77.1 ± 4.44 (0.660)	82.0 ± 5.74 (0.810)	91.0 ± 5.35 (0.760)	97.4 ± 4.86 (0.660)
Level of significance between groups	N. S.	P ∠ 0.10	N. S.	P ∠ 0.10
	Weight (Kg.)			
Experimental	9.2 ± 1.52 (0.338)	10.9 ± 1.80 (0.323)	12.0 ± 1.63 (0.252)	14.0 ± 1.87 (0.248)
Control	8.8 ± 1.22 (0.180)	10.1 ± 1.61 (0.230)	12.0 ± 1.49 (0.211)	13.3 ± 1.67 (0.240)
Level of significance between groups	N. S.	P ∠ 0.05	N. S.	P ∠ 0.05

N. S. = Not Significant

* Mean ± Standard deviation (Standard Error)

A total of 87 members consisting of parents of the children and leaders in the community were administered a questionnaire, which included the following aspects of the programme.

(i) Knowledge about the programme and its purpose,

(ii) Acceptability of the supplement,

(iii) Participation in the programme,

(iv) Benefits or deleterious effects of the supplement.

The responses to the questionnaire were scored and expressed as percentage of the expected total. The results indicated the following:

7. 1. 1. Knowledge about the programme was quite satisfactory and the leaders seemed to be well informed about the content and purpose.

7. 1. 2. The acceptability of the supplement by the child was quite good (63.8%) but the scores of acceptability obtained by the respondents, viz.. parents and leaders, was low. This may be due to the fact that the scores were based on the taste of the preparation, and many of the respondents had no opportunity to taste the preparation.

7. 1. 3. The leaders were found to participtae more actively in the programme than the parents. The reasons attributed for the poor participation especially by the parents were lack of time due to domestic and field work and social and cultural barriers existing in the community.

7. 1. 4. Parents of only 4 children stated that the preparation produced deleterious effects like diarrhoea, cough, etc.

It was concluded from the attitude survey that the majority of the people surveyed were in favour of the programme. Economic status, literacy, availability of time were some of the factors which affect participation in such welfare programmes. In this respect, the leaders scored over the others, thus emphasising the point that for the success of a welfare programme, a favourable attitude and proper orientation of the leaders is very important.

7. 2. Coimbatore Centre

At Coimbatore, the feeding trial was carried out in a rural panchayat area with the co-operation of the local community leaders and officials. The students of the Avinashilingam Home Science College actively participated in the organisation of nutrition education programmes for the mothers.

One of the most acceptable recipes based on maize, green gram dhal and jaggery, was used for feeding 200 children between 6 months and 3 years of age. The food was distributed as 'laddus' packed in polythene bags. Each child received 80g, of the

supplement which provided approximately 11.5 g of protein and 305 calories daily. The study was carried out for a period of 1 year. Before starting the feeding trials, a diet survey was carried out in a randomly selected sample of 30 children, twenty from the experimental and ten from the control group. These data showed that their home diets provided about 600 calories and 13 g. protein. The heights and weights of all the children, participating in the feeding programme was recorded before the trials started and again at 6 and 12 months after the feeding started. For the purpose of comparison, a control group of 50 children of comparable age and socio-economic background from the same village, but not participating in the feeding, were studied. The results indicated that:

7. 2. 1. The growth status of children at the end of 12 months of feeding, as judged by weights and heights, were significantly higher than those of the control group. Also the mean haemoglobin level determined in 33 children before and after the feeding trial showed a significant increase after feeding had been started.

7.2.2. The nutrition education programme carried out along with the feeding programme had effected a favourable change in the knowledge and attitudes of mothers towards the importance of weaning foods for children and also regarding the correct cooking practices.

7. 3. Gandhigram Centre

Popularisation of the recipes was attempted at Gandhigram in four stages. A porridge, based upon local foodstuffs, which was most acceptable, was selected for trials. During the first stage, the auxiliary nurse midwives of the centre undertook the preparation of the porridge at a central place in the presence of mothers. The mothers themselves distributed the food to their children. During the second stage, the recipe flour was distributed free to the mothers and they were taught how to prepare the recipe, so that the feeding could be done at home. Regular check visits to the houses were made and talks on health and nutrition education were given.

During the next stage, actual preparation and feeding of the recipe was carried out in selected localities of some villages. About 40 children in each locality were fed the recipe. In addition, demonstration sessions were conducted every day for a period of one month in each locality. Before moving on to another locality, all the ingredients necessary for the preparation of the recipe were stocked in the local shops and the mothers advised to buy them.

Once all the localities in the village had been covered, free distribution of food was stopped. Nutrition education and demonstration, however, were continued daily and arrangements were made for the continuous availbility of food in the local shops at cost price.

After the cessation of free distribution of recipes, the sales of the packets containing the food ingredients went up from 340 packets per month to 988 packets

per month within a period of 3 months. At the end of two years the sales of the packets reached 3250 mark per month,

An assessment of the impact of the programme showed the following:

(i) A third of the mothers surveyed at the end of the project period were found to breast-feed their newborns earlier then the third day of delivery.

(ii) Some impact had been made regarding the feeding of colostrum. As against 92% of mothers who were discarding the colostrum before the programme started, only 77% of mothers discarded colostrum. This figure, however, is still very high.

(iii) The practice of feeding castor oil to new-borns was almost universal in the beginning, but at the end of programme, about 30% of mothers had ceased to do so.

(iv) The duration of breast-feeding and the age of the child at which supplements were introduced did not show any significant changes.

(v) The method adopted for popularisation of the recipe was found to have been successful. Following the cessation of free distribution of the recipes, the sale of packets containing the ingredients from the local shops, where they were stocked, went up from 340 per month during the first month to almost 1000 per month during the third month. At the end of two years, more then 3000 packets were being sold every month.

7. 4. Poona Centre

The popularisation of the recipes at the Poona centre was initiated in four places-one urban and three rural areas. The urban area was a health centre of the municipal corporation located in a slum area. The rural areas were three villages situated 10–12 miles away from Poona. In one of the villages, the local villages leadership was very poor and there was a lack of co-operation from the community. Very few children attended the feeding centre. This area was, therefore, discontinued and two other villages taken up. where the necessary co-operation from the people was forthcoming. A total of 220 pre-school children from the two villages were fed on a recipe based on groundnut and jaggery (laddoos) which was found to be the most popular, for a period of 10 months. The supplement provided, on an average, 8 to 10 g. of protein and 270 calories per child per day. The preparation and distribution of the food was, during the initial stages, done by the staff of the centre, but later, some of the mothers showed keen interest and helped in the preparation and distribution.

A programme of nutrition education was also carried out by the staff along with the feeding. Two hundred children from two neighbouring villages with similar socio-economic conditions, served as controls for the purpose of evaluation as they did not receive any supplementation.

The results of evaluation carried out at the end of the study showed that:

7. 4. 1. Attendance of children was of the order of 90%

7. 4. 2. Clinically, the children of experimental villages showed lower rates of prevalence of protein-calorie malnutrition and vitamin A deficiency as compared to children from control villages, while the signs suggestive of vitamin B complex and vitamin D deficiency did not show any differences in the two groups of children.

7. 4. 3. Mean values of heights and weights of children in all the age groups, who received supplements, were slightly higher than those who did not receive any supplementary foods.

7. 4. 4. Dietary intake study carried out on these children revealed that the children of both groups consumed almost identical diets at home which consisted mainly of cereals.

7. 4. 5. The parents and village leaders seemed to appreciate the value of such programmes and willingly participated in the programme as long as it did not mean any expenditure on their part. They, however, could not ensure its viability after the withdrawal of help.

7. 4. 6. Rural mothers preferred ready made preparations, since this involved less work on their part.

7. 4. 7. Several false food beliefs held by the mothers were dispelled when they saw for themselves that their children improved considerably because of the food supplements.

7. 4. 8. In the urban area, though the attendance of children was good, and the mothers knew about the programme, some of them considered the recipes as being inferior substitutes to skim milk.

In general, the study indicated that a substantial majority of rural people were in favour of using the recipes for feeding their children, but economic constraints seemed to be an important reason for many mothers not preparing such supplements at home.

7. 5. Calcutta Centre

Urban slum areas of Manicktala were selected for the study. The programme was organised in a corporation maternity centre, where necessary physical facilities for the feeding programme were available. As a first step of the study, a diet survey was carried out on 30 childern between the ages of 1–2 years to assess the extent of deficit in nutrient intake. The data indicated that the home diets of these children provided about 15 g. of proteins and 580 calories a day, representing a substantial deficit in calorie intake with adequacy of proteins—an observation similar to that made earlier in

several parts of the country in a study conducted under the auspices of the Indian Council of Medical Research.

A biscuit recipe based on roasted Bengal gram and broken groundnut, which was found to be most acceptable to the mothers in these areas, was selected as the food supplement. One hundred children between the ages of 1–2 years were fed three biscuits each, which provided about 255 calories and 13 g. protein. The study was carried out for a period of 5 months.

In addition to the feeding, the mothers, who brought the children to the centre, received nutrition education almost every day during the feeding time. Evaluation of the programme indicated the following:

7. 5. 1. 98% of mothers regularly brought their children to the centre for the feeding.

7. 5. 2. 40% of the mothers agrecd to purchase the ingredients and cook the recipe at home and

7. 5. 3. Mothers, who were initially reluctant to prepare the recipe at home, were found to be willing to do so at the end of the survey, since they observed that their children had benefited by the feeding of the biscuits.

7. 6. New Delhi Centre

The third phase of the study was conducted in a rural village of Dado Sarai in Mehrauli block near Delhi. The Mahlia Mandal (Women's Club) of the village provided the room and other physical facilities for conducting the feeding programme. All the pre-school children of the village, excepting those who were participating in mid-day meal programme at a nursery school run by the Department of Social Welfare, were provided with popular recipes of mixed vegetable khicheri, paushtik roti and carrot burfi, one preparation at a time. The feeding programme was run for 105 days.

Although there were 80 children registered for the supplementary feeding programme, their regularity was unsatisfactory—only 25 children having attended for more than 50% of the days. At no time there were more than 37 children present on one day. The poor response despite periodical nutrition education sessions to the mothers, was due mainly to the fact that most mothers considered it economically more profitable to spend their time in collecting fuel for their households or for grazing their cattle in the field than spend it to bring their children to the feeding centre.

However, among mothers who regularly participated, a majority were convinced that the feeding Programme had helped to improve the health of their children. Despite this, only a few mothers had made sincere attempts to prepare the recipes at home. One of the main reasons for some of the mothers preparing the recipes at home was the demand by the children.

8. SUMMARY

A comprehensive study on infant and child feeding practices was carried out in six different regions of the country—Coimbatore, Gandhigram, Hyderabad, New Delhi, Poona and West Bengal, under the auspices of the Indian Council of Medical Research. The main aims of this study were: (a) to collect data regarding the feeding patterns and weaning practices among the poor socio-economic groups, and (b) to develop suitable weaning foods from locally available resources and to devise appropriate methods of evaluating and popularising them among the communities. The salient features of the study are summarised here.

8. 1. A great majority of mothers, in almost all the areas, breast-fed their new-borns on or around the third day of delivery. In Poona and Gandhigram, this practice was mainly due to the traditional habit of not wanting to feed colostrum, while in the other regions, it was due to the belief that lactation is established only around the third day of delivery.

8. 2. Irrespective of the reason for delayed onset of breast feeding in these communities, the feeds given during the first 48–72 hours period between birth and breast feeding were culturally determined. Water sweetened with sugar or honey was the most common first feed in most of the regions.

8. 3. Feeding was done 'on demand' in all the regions; the infants usually received 5–7 feeds during the day.

8. 4. There were considerable regional variations with respect to the duration of exclusive breast feeding as well as the age at which food supplements were introduced. However, there appeared to be a fair degree of uniformity in the type of supplements given by these mothers. Tea, coffee, conjee and porridge based on local cereal or millet, formed the most common supplement. In all regions, most mothers considered cow's millk and bakery products like biscuits and bread as the most desirable liquid and solid supplements respectively, but, due to economic constraints, cereal based supplements were given.

8. 5. The liquid/semi-solid supplements, except in the region of Calcutta, were rarely given to infants before six months of age. In Calcutta, Coimbatore and Gandhigram, the solid supplements were introduced generally before the age of one year, while in Hyderabad. Poona and New Delhi, such supplements were introduced invariably after one year of age.

8. 6. Some of the important reasons for introducing supplementary foods were insufficiency of breast milk, the mother having to go out for work, a desire to give additional food and the ability of the children to pick up and eat solid foods, rather than any awareness on the part of the mothers of the special nutritional needs of their children.

8. 7. Based on the information regarding the local availability of various types of foods, three types of recipes were developed at each centre: (i) recipes which could easily be prepared fresh at home daily by the mothers, (ii) ready-to-consume infant food mixtures, which could be made by mothers at home in bulk quantities and used as and when needed, and (iii) recipes like biscuits and toffees which could be prepared on a commercial basis by local tradesmen sold in village shops. A total of 82 such recipes were developed by the various centres and the acceptability of these recipes was established. The nutritional evaluation of many of these recipes was carried out at Hyderabad and Coimbatore.

8. 8. Methods to popularise the recipes developed were undertaken at each centre. This was generally in the form of supplementary feeding-cum-nutrition education programme designed to demonstrate the beneficial effects of supplementary feeding on the health of the children in the community. It was observed that such programmes when well organised, resulted not only in the improvement of the nutritional status of the children but also tended to correct some of the wrong food beliefs held by mothers with respect to feeding of their infants and children.

ANNEXURES

I. Proforma for the survey of locally available protein-rich foods.

II. Proforma for collection of information on Infant Weaning Practices.

INDIAN COUNCIL OF MEDICAL RESEARCH
NEW DELHI

Enquiry on Infant Weaning Foods

I. Proforma for the survey of locally available protein-rich foods :

Name of interviewer : Date of interview :

1. Name of village : Block :

Taluk : District :

2. Population of the village : *Males* *Females*

Adults (15 years and above) :

Children (5–15 years) :

Children between 3 years and 15 years :

Infants and children below 3 years :

Total :

Grand total :

3. Number of households (Families) :

4. 1. Livestock in the whole village :

4.1.1. Milch cows :

4.1.2. Milch Buffaloes :

4.1.3. Goats :

4.1.4. Others (specify) :

4. 2. Yield of milk per day :	*In local measure (specify)*	*In Litres*
4.2.1. Per milch cow :		
4.2.2. Per milch buffalo :		

5. **Poultry :**

5.1. Total number of laying birds in the whole village :

5.2. Approximate yield *per week per bird* : eggs

6. **Fish :**

6.1. State whether a pond or other sources are available for fishing (specify) :

6.2. Approximate yield of fish per day :

6.3. Name the months when fish is caught :

7. Other foods produced in the locality :

Foods	Season of Production	Whether consumed by the local people	Approximate production per annum in Kgs. in the whole village
7. 1. Cereals :			
Rice			
Wheat			
Jowar			
Bajra			
Ragi			
Others (specify)			
7. 2. Legumes :			
Redgram			
Bengalgram			
Blackgram			
Greengram			
Other pulses (specify)			

7. 3. **Nuts and oilseeds :**

Groundnut

Sesame

Safflower

Other
(specify)

8. **Foods available through lacal shops or in weekly shandies.**	Cost per unit (specify Kg., litre or No.)

8. 1. **Cereals :**

Rice

Wheat

Jowar

Bajra

Ragi

Others (specify)

8. 2. **Legumes :**

Redgram

Bengalgram

Blackgram

Greengram

Other pulses (specify)

8. 3. **Nuts and Oilseeds :**

Groundnut

Sesame

Safflower

Others (specify)

8. 4. **Milk and Milk products :**

Cow Milk

Buffalo milk

Buttermilk

Curds

Others (specify)

COMMUNITY HEALTH CELL
326, V Main, I Block
Koramangala
Bangalore-560034
India

8. 5. Flesh Foods : Cost per Unit (specify Kg., Litre or No.)

8. 5. 1. Meat

8. 5. 2. Eggs

8. 5. 3. Poultry

8. 5. 4. Fish

8. 6. Protein-rich snacks sold in shops :

1. Sesame balls
2. Groundnut
3. Bengalgram balls
4. Amaranth seed balls (Rajakeero)
5. Others (specify)

9. Whether Applied Nutrition programme is in operation in the village : Yes/No

Programme under the A.N.P.

Poultry Yes/No

Fisheries Yes/No

Vegetable Garden Yes/No

10. Other health and developmental programmes in the village t

Specify -

11. Leadership and kinship patterns in the village :

Key to the Proforma for the Survey of locally available protein-rich foods:

This proforma is intended to serve only for the guidance of the investigator. The persons who will be actually concerned in the administration of the proforma will be trained by the officer-in-charge of the enquiry in this. The information required to be collected has to be gathered by the interviewer by appropriate means such as (e. g.) using a proforma prepared in the local language, by more than one visit, if necessary etc.

This proforma will be used to collect information from all the following sources in the selected villages:

a) Village headman or other leaders.

b) two or three shops dealing with food in the local shoping centre.

c) land-lords in the village willing to give the information; and

d) teacher in the village school.

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1. This can be recorded by enquiry locally.

2. Figures for the age and sex-wise distribution and total population may be obtained from the village headman or the local officer of the National Malaria Eradication Programe.

3. Figures to be obtained from the sources as in (2) above.

4.1. This figure may be obtained from the livestock census maintained by the village headman and/or from the veterinary surgeon at the block level.

4.2. This figure may be obtained from the sources in 4.1 above and from others who are contacted in the village. Record the figures in litres, if possible. If not record in local measures and specify the name of the measure.

5.1. and 5.2. These data can be collected from the village headman or from the veterinary officer at the block level.

6. Collect this information from the local fisherman or village headman.

7. Collect these data specially from (a) the village headman, (b) land-lords in the village and (c) school teacher.

8. Collect the information from the local shops and tick only those items which are available locally and indicate their cost.

8.4. Note whether milk products like khoa, channa are available and their price.

8.5.2. Specify if eggs other than those of the hen such as duck's egg, turtle's egg are used.

8.5.4. Any sea-food such as crab, shrimps etc. can also be included under this and the name mentioned.

10. Mention programmes for development of animal husbandry, mid-day meal programmes for children, community development programmes etc. if in operation.

11. Mention the persons who are acknowledged as the leaders in the village and also the important persons in a family (such as grand-parent, uncle, father etc.) who is responsible for family budgeting and food expenditure by the family.

12. In addition to gathering data by enquiries, data from personal observations obtained after going round the village can be used as check.

INDIAN COUNCIL OF MEDICAL RESEARCH
NEW DELHI

Enquiry on Infant Weaning Foods

II. Proforma for collection of information on 'Infant Weaning Practices' :

N. B.: The information to be collected through this proforma pertains to the youngest child in the family.

Name of interviewer : Date of interview :

1. General information :

1.1. Name of the village :

Block :

District :

1.2. Informant's name : Age Years

Complete postal address of the family :

Relationship of the informant to the child | Mother/Others (specify)

Religion : Caste :

Educational level of the informant : Illiterate/Literate Schooling / No schooling

2. Number of earning members in the family :

2.1. Occupation of the earning members of the family :

2.2. Educational level of the parents of the child :

Mother		Father	
Illiterate/Literate	Schooling / No schooling	Illiterate/Literate	Schooling / No schooling

2.3. Do you have your own land : Yes/No

2.4. If yes, acreage : Cultivated :
Uncultivated :

2.5. Milk-yielding animals at home :

2.5.1. Number of cows : Bufflaoes : Goats :

2.5.2. Meat animals at home Hens : Sheep : Pig :

2.5.3. Farm animals : Bullocks :

2.6. Number of members in the family : Adults Children (Below 15 years)

Total :

2.7. Give ages of children (in years and months) (below 15 years)

	Years	*month*
1.		
2.		
3.		
4.		
5.		
6.		

3. Food resources :

3.1. What food is produced in your farm? Indicate whether this is adequate for the use of the family.

	Adequate / Inadequate	*Quantities produced per annum*	*Cash equivalent*
Foodgrains (specify)			
3.1.1. Vegetables			
3.1.2. Eggs.			
3.3.3. Milk			
3.1.4. Others			
Total :			

3.2. Do you have to purchase foodgrains from the bazar? Yes/No

If yes, do you depend on these -

Completely / Partially / Occasionally

3.3. Total yearly income of the family in cash :

Cash equivalent of farm income : _____

Total : _____

4. Age of the child : Sex :

5. **Foods of the infant and mother in the first few days after delivery :**

5.1. Mother's food :

Foods specially taken	How long	Reasons	Foods avoided	How long	Reasons

5.2. Galactogogues :

Can you name any food which is supposed to increase secretion of breast-milk	Foods you have consumed among these

5.3. **Child's food :**

5.3.1. Do you breast-feed the child? Yes/No

5.3.1.1. If yes, did you start breast-feeding from the first day of delivery? Yes/No

5.3.1.1.2. If no, why not?

5.3.1.1.3. When did you actually start breast-feeding, if you did not do it on the first day ?

5.3.2. If you are not breast-feeding at all, why not?

5.3.3. Do you discard the colostrum? (use the local name) Yes/No

5.3.3.1. If yes, do you give any other food to the child on the day of birth? Yes/No

5.3.3.2. If yes, specify.

6. Details about breast-feeding:

6.1.1. Is the child given the feeds at regular intervals? Yes/No

6.1.2. How many feeds a day?

6.1.3. Any night feeding? Yes/No

6.1.4. Is the baby given any water? Yes/No

6.1.5. If yes, how many times a day?

7. Wet-nursing :

7.1. Is wet-nursing prevalent in you community? Yes/No

7.2. Has your baby been wet-nursed? Yes/No

7.2.1. If yes, how long?

8. Liquid Supplements :

8.1.1. Do you purchase any milk? Yes/No

8.1.2. How much daily?

8.1.3. If you possess animals, what is the daily milk yield?

8.1.4. Which milk do you use for feeding children cow/buffalo/goat/others (specify)

8.1.5. Do you use tinned milk? Yes/No

8.1.6. Do you use any other liquid preparations? Yes/No
If yes, is it prepared from
— Coconut
— Groundnut
— Jowar
— Others
— (Specify)

8.2.1. How much water is added to **each cup of milk** before it is given to the children?

8.2.2. What sweetening agent is added? Sugar/Jaggery

8.2.3. How much sweetening agent is added to each cup? ...Spoons...

8.2.4. If no sweetening agent is added, why?

8.3.1. Total quantity of milk per feed :

8.3.2. Total number of feeds per day :

8.3.3. Total amount of undiluted milk given to the child per day :

8.3.4. What is done to the milk, if any, left over by the child?

8.3.5. How is the milk stored?
Open pot/Covered pot/any other (specify)

8.3.6. Is the milk given to the child preboilded/just heated/ neither?

8.3.7. Is the milk boiled each time? Yes/No

8.4. Kind of milk supplements :

Source of milk	Preference*	Reasons for prefrence	If given, reasons for giving
Cow			
Buffalo			
Goat			
Tinned milk			
Other (specify)			

*Check (√) the ones preferred:

9. **Solid Supplements :**

9.1. What food other than breast-milk or milk do you give to your child first?

9.1.1. Do you perform any religious ceremony at the time of giving solid food to the child for the first time?

9.1.2. What foods do you prepare on the first feeding day? (details)

9.1.3. Do you give the same food subsequently? Yes/No

9.1.4. If no, why not?

10. **Age of giving supplementary foods :**

Name of food	Age of Starting	Reasons for preference	At whose instance	How prepared?
Liquid food :				
1.				
2.				
3.				
4.				
Solid foods :				
1.				
2.				
3.				
4.				

Foods avoided for infants :

Any food avoided by you for your child at present	Reasons
1.	
2.	
3.	
4.	

Key to Proforma on Infant Weaning Practices

A sample of families with children between the ages of 6 months and 3 years will be first selected using the statistical considerations as described in the minutes of the meeting. This questionnaire will be administered to the mother or the nearest relative of the child who is prepared to give information about the child. As far as possible, interview adults only. It my be necessary to make more than one visit to the family to collect all the information, but attempts should be made to collect all the information in one interview. The proforma can be translated in the local language and administered by the interviewer after adequate training by the officer-in-charge of the enquiry.

N. B: The information to be collected in this questionnaire pertains to the **youngest** child in the family.

1.2 and 2.2. Specify if the schooling is above the primary school level.

2.1. List the occupations of all the earning members.

2.5. Members of the family aged 15 and above are to be considered as adults.

3.1. Collect information for the one year preceding the date of interview only. If the figures for the production of vegetables, egg and milk are stated on the basis of yield per day or week, record the information as such and later calculate the per annum figures. Calculate the cash equivalent based on the local prevailing prices for these foods.

3.3. Here mention the total cash incomes of all the family members, under 'cash equivalent of farm income', give the figure given under 3.1.4. The sum of both these figures representing total cash value of the income is recorded against "Total".

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